

Classified

RATES: Fifty words or less, one insertion, \$2.00; additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS WANTED

WANTED—DESIGN ENGINEER. Prominent manufacturer seeks draftsman with experience in design of electric refrigeration controls. Consideration will only be given applicants who give definitely in first letter their experience in this field. State salary expected for this excellent opportunity. Replies held confidential. Box 806, Electric Refrigeration News.

SALES MANAGER of commercial and domestic refrigeration and appliances, now employed, desires similar position with aggressive distributor or dealer, preferably in South. Twelve years' experience in refrigeration and appliance selling. Can train salesmen, organize and develop territory. Can figure, accurately, all types commercial jobs. Give full particulars in first letter. Box 803, Electric Refrigeration News.

COMPETENT SERVICE and installation man would like connection with high-class manufacturer, jobber, or dealer as service manager or traveling representative. Some selling ability. 36 years old, married, member Masonic Fraternity. 12 years with present firm. Best references. Box 805, Electric Refrigeration News.

EQUIPMENT WANTED

WANTED TO BUY—General Electric hermetic sealed units, household models preferred. REX REFRIGERATION SERVICE, INC., 446-48 East 79th Street, Chicago.

EQUIPMENT FOR SALE

NEW, single and twin cylinder methyl compressors, especially adaptable, domestic and small commercial installations; condensers, receiver valves, pulleys, fans; motors, $\frac{1}{2}$ to $\frac{1}{2}$ H.P.; fittings, expansion valves, Bristol recording instruments, etc. All new merchandise in original containers. Will make prices attractive for quick disposal. Box 775, Electric Refrigeration News.

REFRIGERATOR DEALERS! Make money with Federal's reconditioned refrigerators, 1000 refrigerators such as Frigidaire, G. E., Kelvinator, Electrolux, etc., completely remanufactured and rebuilt; some as is, as low as \$15; also hundreds of new refrigerators priced for promotional purposes. Federal Refrigerator Corp., 57 East 25th St., New York.

FRIGIDAIRE MODEL G twin cylinder highsides $\frac{1}{2}$ hp., \$24.50. Model S, \$19.50. Model A, \$29.50. Single cylinder \$15.00. Model N, $\frac{1}{2}$ hp., \$60.00. Model C, \$15.00. Kelvinator single cylinder \$15.00. Twin cylinder, $\frac{1}{2}$ hp., \$30.00; $\frac{1}{2}$ hp., \$55.00; $\frac{1}{2}$ hp., \$65.00. Copeland $\frac{1}{2}$ hp. Model L complete with motor and compressor in working order, \$4.75. FEDERAL REFRIGERATOR CORPORATION, 57 East 25th Street, New York City.

METERING METERS:—We have approximately 250 General Electric metering payment meters for sale. Complete with gears for 15¢—20¢—25¢ daily payments. All are in good working order. Will close out at \$2.00 each f.o.b. Pittsburgh, Pa. Spear and Company, 915 Penn Avenue, Pittsburgh, Pa.

FRIGIDAIRE plain T two temperature valves \$2.50. Merco No. 848 controls complete with tube \$5.00. Try Warrenol for stuck-up compressors. Samples available. Thermostats, float valves, and expansion valves rebuilt. Prompt service. Same day shipment on refrigerant gases. Halectric Laboratory, 1793 Lakewood Road, Cleveland, Ohio.

REPAIR SERVICE

GENERAL ELECTRIC sealed units repaired, rebuilt, exchanged, \$19.50 up. Majestic sealed units repaired, rebuilt, exchanged, \$17.50 up. Largest shop and best equipped in the country. Satisfied customers in every part of the United States. Ship to us. Immediate service. Also U. S. Hermetics. Wholesale only. Refrigerator Engineering Parts & Service Co., 2800 So. Parkway, Chicago, Ill.

MAJESTIC UNITS: any model, rebuilt or exchanged \$20.00 f.o.b. Chicago. Guarantee six months. All models in stock for

THE MASTERCRAFT ADJUSTABLE PAD AND CARRYING HARNESS FOR SAFE DELIVERY OF AUTOMATIC REFRIGERATORS

Pad and harness adjustable to many sizes and styles of cabinets. Economical—Efficient. Sturdily constructed, easily applied. Name of refrigerator attractively lettered on pad without charge.

Pad (Adjustable) \$9.50 ea.

Harness (Adjustable) \$6.00 ea.

Illustration at left shows type F adjustable carrying harness and adjustable pad.

For other types, also individual carrying straps, write for full information.

BEARSE MANUFACTURING CO.
3815-3825 Cortland Street, Chicago, Illinois

prompt exchange. Wholesale only. Refrigeration Products, Inc., 122 W. Illinois St., Chicago, Ill.

MAJESTIC UNITS repaired \$17.50. General Electric units, \$30.00. Send your Majestic units to Ft. Smith and get them fixed right. We positively guarantee that we can make Majestics freeze as fast as when new. Peno Service Co., Ft. Smith, Ark.

FIX MAJESTICS YOURSELF. Service men—get out of competition and get in the money; be first to know how to fix Majestic and General Electrics in your community. We give you step by step instructions on how to open these units and repair them. These instructions are told to you in service man's language so any service man can understand them. Majestic instructions \$10.00—General Electric instructions \$5.00. Remember if you don't learn how to fix sealed units, you will soon be eliminated. Peno Service Company, Ft. Smith, Ark.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

Questions

"How to Sell Ranges"

No. 2797 (Distributor, Georgia)—"We understand that you have a book put out by Mr. Conover, title 'How To Sell Ranges'. Please give us definite information on this at your earliest convenience."

Answer: We do not publish the book, "How to Sell Ranges."

For information about this book, you might write the author, Mr. George R. Conover, managing director, The Electrical Association of Philadelphia, Architects Building, 17th St. at Sansom, Philadelphia, Pa.

Grunow Rights on Carrene

No. 2798 (Distributor, Michigan)—"Will you please send us the authentic date Grunow was granted the exclusive rights to Carrene by the Carrier Corp."

"Some of our competitors have printed pamphlets stating that Carrene is not exclusive to Grunow.

"I would like this information for that purpose."

Answer: Address your inquiry to either General Household Utilities Co., Chicago, or Carrier Engineering Corp., Newark.

Door Gaskets

No. 2799 (Distributor, England)—"We are looking for an exceptionally soft gasket for doors of commercial refrigeration cabinets and rooms and shall be much obliged if you could pass this information on to manufacturers in your country, or, if you would be good enough, to give us names and addresses."

"Standard types of commercial gaskets are much too hard for the purpose we have in view; what we are looking for is something as resilient and as easily compressible as that used on household models.

Answer: Get in touch with: Miller Rubber Co., S. High St., Akron, Ohio

Jarrow Products Corp., 143 W. Austin Ave., Chicago, Ill. E. I. DuPont de Nemours & Co., Inc., Fabrics Division, 350 Fifth Ave., New York, N. Y.

Manufacturers' Schools

No. 2800 (Student, Michigan)—"Several times I have noticed mention of air-conditioning and refrigeration schools operated by the larger manufacturers of this equipment, in articles in ELECTRIC REFRIGERATION NEWS."

"At present I am a student of the Refrigeration and Air Conditioning Institute of Chicago, and upon graduation from this course I am anxious to enter one of these schools as a student in air conditioning and refrigeration engineering."

"I have turned to you as a possible source of information concerning these schools, and would appreciate it very much if you could supply me with the following information, or advise me where it might be obtained elsewhere."

"Do the General Electric, Frigidaire, and Carrier Engineering Corporations operate such schools? What executive might I write to in the respective companies to get the details concerning them? What are the entrance

TEMPIRETE INSTANTANEOUS BEER and WATER COOLERS

Detroit Michigan

qualifications, cost of training, time required for training, and employment possibilities upon graduation? Where are they located? In short, I will be grateful for any facts you can give me."

"In case these schools are not accepting students I would like to contact a firm of engineers or a contractor handling air conditioning and refrigeration business who might be interested in taking on a young man who is well grounded in the theory and practice of this industry and is willing to serve an apprenticeship under an engineer to learn the business from the ground up. I have considered putting an advertisement in your paper to this effect, and will do so if you deem it advisable.

"My ambition is to become an engineer in this industry, and a good one. Therefore I am willing to make any reasonable sacrifice necessary to gain this objective. I fully realize the importance of pursuing the subject farther under the proper guidance, hence my interest in the higher training.

"In closing may I congratulate you on the splendid growth of your publication in the past year. A year ago my subscription became delinquent and was recently renewed. It was apparent at a glance that you have progressed steadily as the industry itself. May you continue to do so."

"I am enclosing stamps for your reply and would like to be placed on your catalogue mailing list."

Answer: Most of these schools are conducted for the benefit of engineers in dealer organizations that sell the manufacturers' products. In some instances, however, the manufacturers do train new men in these schools for either factory or field work. We would suggest that you contact the following with reference to this type of activity:

W. M. Timmerman, Manager Commercial Engineering Dept. General Electric Co., Nela Park, Cleveland Ohio

V. S. Day, Engineering Dept. Carrier Engineering Corp., Newark, N. J.

H. M. McGaughey, Manager Commercial Applications Dept. Kelvinator Corp., Detroit, Mich.

Virgil Hetzel, Mgr. Installation and Service Frigidaire Corp., Dayton, Ohio

John Hertzler, Manager Air Conditioning Dept. York Ice Machinery Corp., York, Pa.

Ice Cube Makers

No. 2801 (Dealer, Republica Dominicana)—"Through the courtesy and recommendation of the Stewart-Warner Corp. of Chicago, we are writing to you to ask you to inform us the manufacturer of electric refrigerators who can supply models of refrigerators to produce from 200 to 500 ice cubes."

Answer: We suggest you get in touch with the following companies:

Fedders Manufacturing Co., 57 Tonawanda St., Buffalo, N. Y.

Peerless Ice Machine Co., 515 W. 35th St., Chicago, Ill.

Trenton Auto Radiator Works, Trenton, N. J.

Saturation by Towns

No. 2802 (Food Manufacturer, Illinois)—"We would like to know if you have figures available showing the percentage of electric refrigerator sales in small towns of, say, 5,000 to 10,000 population, or even smaller, as compared to cities of 300,000 and over."

"Our reason for making this request is that we are marketing an ice cream powder which is prepared in electric refrigerators. Naturally any figures you have would be very beneficial to us in determining our sales and advertising program for these small markets. In considering the smaller towns it occurs to us that they might prove a better outlet for ice creams of this type made in the home as against the larger cities where the large ice cream manufacturers have so many retail outlets and are doing a heavy merchandising job."

"Answer: It is very difficult to give an accurate answer to your question regarding electric refrigerator sales in towns of 5,000 to 10,000 population. In the first place, there is no specific way to check up on where refrigerators are sold (such as in the automobile industry where car registration serves as a check). It is true that the manufacturers report on sales to distributing outlets, but this provides no index to the geographic distribution of retail sales."

The Federal Government and some independent market survey agencies have made studies of sales in particular cities, but these have always been in cities of considerable size.

These studies together with a reasonably fair estimate of market saturation in major cities would lead one to believe that the percentage of refrigerator sales in cities of more than 10,000 population is greater than in cities of less than 10,000 population.

qualifications, cost of training, time required for training, and employment possibilities upon graduation? Where are they located? In short, I will be grateful for any facts you can give me."

"In case these schools are not accepting students I would like to contact a firm of engineers or a contractor handling air conditioning and refrigeration business who might be interested in taking on a young man who is well grounded in the theory and practice of this industry and is willing to serve an apprenticeship under an engineer to learn the business from the ground up. I have considered putting an advertisement in your paper to this effect, and will do so if you deem it advisable.

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Virgil Hetzel, Mgr. Installation and Service Frigidaire Corp., Dayton, Ohio

John Hertzler, Manager Air Conditioning Dept. York Ice Machinery Corp., York, Pa.

Answer: We do not publish the book, "How to Sell Ranges."

For information about this book, you might write the author, Mr. George R. Conover, managing director, The Electrical Association of Philadelphia, Architects Building, 17th St. at Sansom, Philadelphia, Pa.

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REFRIGERATION NEWS

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Air Conditioner System Orders Lower in April

U. S. Reports Sales Gains In 4 Types of Systems For Air Conditioning

WASHINGTON, D. C.—Orders booked for air-conditioning systems and equipment during April totaled \$3,264,602 to bring the total for the first four months of the year to \$11,667,129, according to a report covering 98 manufacturers released through William L. Austin, director of the Bureau of the Census, Department of Commerce.

The April figures represent a decrease in value of orders of 6.1% from the March total of \$3,447,752. The month's total is, however, well ahead of January and February figures.

Value of air-conditioning orders alone dropped to \$1,595,664 in April, from a March high of \$1,859,786. Business in this classification during the first four months of the year now stands at \$5,517,994.

Increases in orders were noted in three branches of the air-conditioning field during the month; with these exceptions, decreases ranged all the way from \$289,000 to \$2,000.

Biggest gain was in orders for refrigeration or cooling media sold to contractors for air-conditioning systems who are not manufacturers of air-conditioning equipment. The April (Concluded on Page 2, Column 1)

6100 Refrigerators Sold in Cleveland Area during May

CLEVELAND—With the sale of 6,100 electric refrigerators during the month of May, distributors of electric refrigerators in the Cleveland metropolitan territory set a new all-time high.

May distributor sales represent an 87.5% increase over May, 1935, and bring the percentage of increase for the first five months of this year to 38.3% above the same period of 1935.

Kelvinator Shipments for Eight-Month Period Total 241,177 Units

DETROIT—Kelvinator refrigerator shipments totaling 241,177 units for the eight-month period from Oct. 1 to May 31 surpassed shipments for the entire fiscal year of 1935 by 837 units, reports H. W. Burritt, vice president in charge of sales.

A.S.R.E. Convention Opens Monday at Skytop

SKYTOP, Pa.—New developments in air-conditioning engineering, food refrigeration, and thermal problems will be the three principal topics of discussion when members of American Society of Refrigerating Engineers meet in their twenty-second spring meeting here next Monday, Tuesday, and Wednesday.

Air conditioning will be covered in a joint session with American Society of Heating & Ventilating Engineers, meeting simultaneously at nearby Buck Hill Falls.

Willis H. Carrier, chairman of the board of Carrier Engineering Corp., and a past president of both societies, will preside at the joint session. Topics of discussion at this meeting include:

"Theory and Practice of the Heat Pump," by C. W. Chamberlain, Michigan State College, Lansing, Mich. (Concluded on Page 2, Column 5)

Sparton Distributors to Convene June 25-27

JACKSON, Mich.—Distributors from all sections of the country will meet here at the annual convention of the Sparks-Withington Co. June 25, 26, and 27 to view the 1937 line of Sparton radios.

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DETROIT, MICHIGAN, JUNE 17, 19

Conditioning System Sales Drop in April

(Concluded from Page 1, Column 1) total in this field was \$273,932, compared with a March figure of \$124,017.

Humidifiers, which had shown a decrease in March, came back strong in April to total \$57,016 against a March figure of \$43,401. April's total, however, is still considerably below the January high mark of \$83,192.

Air washer orders were the third class to show a gain, the April figure being \$79,160 against a March total of \$71,673.

Orders for unit systems, self-contained and otherwise; central station systems, for both comfort cooling and industrial use; and air filters dropped off during April. Self-contained systems fell off from a March high of \$123,861 to \$102,788; unit systems not self-contained from \$639,665 to \$541,155; central-station systems for comfort cooling from \$717,498 to \$428,844; industrial systems from \$95,970 to \$93,632; and air filter orders from \$43,701 to \$19,137.

April orders in the fan group registered a slight gain, going from a March total of \$1,055,930 to \$1,093,267. Orders in the unit heater group also rose more than \$13,000, totaling \$575,671 compared with \$562,036 during March.

Tabulation of air-conditioning orders for April and the total for the first four months of the year will be found on page 13 of this issue of the News.

125 Tons of Air Conditioning Will Be Installed In New Warehouse and Office Being Built By Westinghouse at Mansfield

(Concluded from Page 1, Column 4) modern kitchen, and facilities for a Home Economic Institute.

In the warehouse will be a special conveyor system which will take the product from the manufacturing aisles through the overhead bridge, to the first three floors of the warehouse. As these products come from the lines of production crated for shipment they will be transported over the conveyor system. The system will also be connected with the enclosed loading dock of the train shed which occupies the entire west side of the building on the first floor, enabling the product to be taken from the production line directly to the cars, if it is not stored.

Modern Design for Entrance

A modern design of aluminum and black Carrara glass will be used for the main entrance on the north side of the building and for the ground floor foyer.

A 40ft.x40ft. fifth floor foyer will use a special Linolite floor, semi-indirect lighting, beamed ceiling, and pylasters all of which will make for massive treatment, the architects say.

On the north and south walls of the display rooms which lead from the upstairs foyer will be specially lighted recessed displays approximately 20 ft. wide.

Main Display Room

Large apparatus and merchandise will be on exhibit in the main display room, which will also be used as an assembly room for special meetings. This room is fitted with a stage for displaying merchandise and has theatrical lighting effects, a screen, and apparatus for sound moving pictures. A built-in projection room at the extreme end of the room, and stage floor space of 40x100 ft. with a proscenium opening 36 ft. wide and 12 ft. high, special backs, and screens, and

other stage paraphernalia will be included in the equipment.

Eight 1500 watt semi-indirect fixtures will light the room. Interior walls will be covered with sound proof insulation for acoustic qualities; this material will be laid in block form and treated to give the appearance of stone for decoration. A plaster wainscoting, trimmed with aluminum casings and moldings, with black glass back-board, will be used around the room to a height of 7½ ft. between the small room arches. Brown, cream, blue, and silver will constitute the color scheme.

8 Smaller Rooms for Display

Eight smaller display rooms, each 20 ft x 20 ft. will open on the main room through a 10 ft. arch. Each of these rooms will contain one 1500 watt semi-indirect fixture with additional facilities for spot-lighting apparatus to give special treatment to merchandise on display when desired.

Plans also call for 60 offices and space for groups of advertising, sales, sales promotion, and accounting activities on this floor.

Domestic Science Institute

At the rear of the large display room is located space for the Domestic Science Institute which will be used to train economists and specialists; also connected with the institute will be experimental kitchens and laboratories, where refrigerators, ranges, laundry equipment, and other household appliances will be tested. An experimental kitchen planning laboratory will also be constructed to carry on work to promote creative design and kitchen planning work.

Immediately adjacent to the institute will be the photographic department, where a special dark room will be built and small work rooms and developing rooms included so that the department will be equipped to do advertising, sales merchandising, and domestic science experimental work with color films.

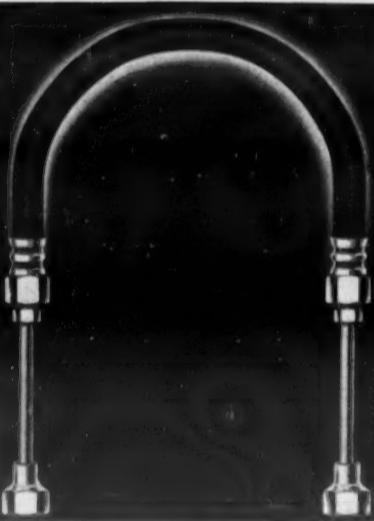
Air-Conditioning Equipment

Air-conditioning equipment for the building calls for 125 tons of refrigeration supplied by six compressors: four 25 ton units, and two 15 ton units. Two of the compressors will be located for easy inspection by interested visitors.

The entire fifth floor will be equipped with a duct system for heating and cooling. All of the air on this floor will be filtered and additional fresh air as required, will be supplied to the working area.

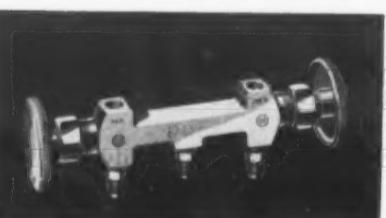
QUEEN MARY

is to
Transportation



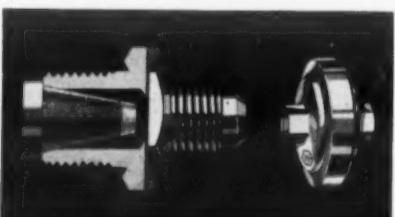
Presenting the only adaptable steel Manifold on the market. Welded steel in construction with fully threaded bosses to hold valves securely. Weatherhead Manifolds hold valves without soldering. These thoroughly adaptable units reduce inventory. All parts completely tin plated. Made in two to ten valve units with two valve spacings.

These manifolds are not only better, they are actually cheaper. Weatherhead engineering is always a jump ahead. A glance at the other items on this page will convince you.



Indispensable Testing Valves for charging gas into high and low sides... testing low side for leaks... purging gas or air from high side... changing oil in low side... purging gas from gauge line, setting expansion valves, setting low side controls. Makes recalibration of gauges easy. Absolutely necessary to the service man. This modern valve embodies that perfect construction for which Weatherhead is noted.

The refrigeration industry needed a flexible Charging Hose which could stand up under all refrigerants in use today. Weatherhead created this hose—a product of modern chemistry. Available in complete range of sizes and lengths. Six inches of copper tube at each end which may be replaced as often as necessary.



Filters for straining as only Weatherhead knows how to make them. Constantly practicable for catching all refuse.

Fairbanks-Morse to Tie in with Contest

(Concluded from Page 1, Column 5)

Broadcasting System. The program is designed to reach women and will be broadcast at two different periods in the morning (one for the East, and the other for the West).

A contest will be a feature of the program, listeners being invited to vote for which of the six different programs on the hour's broadcast they like best, and to give the broadcast a name (like Maxwell House "Showboat" etc.). That's where Fairbanks-Morse enters the picture, 50 F-M refrigerators and 300 F-M radios being offered among the prizes.

But the "plug" which F-M products will get on the broadcast is not the only way in which F-M will benefit from this tie-in. Large banners and other display material in grocery stores will ballyhoo the contest, and the F-M refrigerators and radios offered as prizes will be depicted in this display material.

Another new promotion aid to help F-M refrigerator dealers get business the remainder of the year is a 4-page newspaper size folder in brilliant colors, illustrating and describing the features of the F-M refrigerators. It will be distributed by companies specializing in door-to-door distribution work, explained A. L. Decker of Henri-Hurst & McDonald advertising counsel for the Fairbanks-Morse Home Appliance Division. The factory will stand half of the cost on this promotion stunt, it was announced.

C. E. Ceperly, advertising and sales promotion manager of the Home Appliance Division, described two contest plans designed for use by F-M dealers. One is a consumer "menu contest" and the other is a contest which involves a search for the oldest F-M product in the dealer's territory. Complete plans and newspaper mats for these contests are now ready, Mr. Ceperly explained.

Mr. Ceperly also explained that "Fairbanks-Morse" does not believe in the theory that all dealer set-ups are established by March 15" and announced that dealer-getting activities would be aggressively continued.

Extension of the refrigeration department's laboratory facilities to include complete test equipment and material to test not only the company's own refrigerator, but also other makes, was announced by Refrigeration Engineer Frank Pelletier. Apparatus has also been set up to test expansion valves for superheat, friction, and needle seating, and also for testing cold controls, Mr. Pelletier declared.

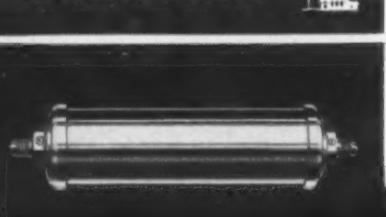
Mortimer Frankel, assistant general manager of the F-M Home Appliance Division, spoke on "distributor cooperation" and urged distributors to take advantage of factory cooperation.

At the session on home laundry equipment the distributors were urged to push a three-months dealer-getting drive. The time limit was recommended so that the distributors and dealers could concentrate on retail selling activities.

Distributors were urged to do everything to make the dealer "conscious" of the home laundry franchise; a considerable amount of literature has been prepared for use by the dealer organization, and the factory executives urged the distributors to demand reports on the progress of the home laundry line from field men.

MARCONI

to
Communication



Never ceasing zeal in perfecting an instrument for effectively removing moisture has put the Weatherhead Dehydrators where they are today. Available in small size for permanent installation, and large size for service. In the same class is the Scale Trap with maximum strainer area.

Air Conditioning & Food Refrigeration Problems On ASRE Program

(Concluded from Page 1, Column 1)

"Application Factors Which Govern the Selection of Freon Refrigerating Equipment for Air-Conditioning Service," by J. R. Hertzler; and "Water Supply as Affected by the Demand for Summer Air Conditioning," by D. C. Morrow, vice president of Community Water Service Co., Washington, D. C.

Food refrigeration will be covered in the first ASRE session, at which President L. S. Morse will preside. Papers scheduled for delivery at the meeting include "The Farmer's Egg Pre-Cooling Problem," by J. E. Nicholas, associate professor of agricultural engineering at Pennsylvania State College; "Defrosting," by S. Rupprich, New York City consulting engineer; "Application of Refrigeration to Brewery Stock Rooms," by Walter Jones of Carrier Corp.'s New York City office; and "A Review of Fish Refrigeration Methods," by D. B. Finn of the Biological Board of Canada, Halifax, N. S.

Final session will study thermal problems in the domestic-commercial field, and will be presided over by A.S.R.E. Vice President H. M. Wilkins.

Papers include "A Review of Practice in Domestic and Commercial Ice Refrigeration," by C. F. Holske of American Ice Co., New York City; "Dehumidification with Air Conditioning," by William Goodman of Trane Co., LaCrosse, Wis.; "Shell Type Porcelain Enamel Refrigerator," by F. C. Meacham and E. F. Schweller of Frigidaire Corp., Dayton; and "Infiltration Characteristics of Entrance Doors," by Arthur H. Simpson of Van Kannel Revolving Door Co., New York City.

Thompson Will Clothe Salesmen Making 100 Demonstrations in 1936

BOSTON—A recent check-up revealed that 92.8% of the refrigeration demonstrations made by W. L. Thompson, Inc., General Electric dealer, were closed in 1935, so that company is offering every salesmen who obtains 100 "demos" in 1936 a "complete deluxe Beau Brummel outfit of clothing, consisting of a suit, and all that goes with it," reports Joe Maloney, general sales manager.

Each salesman is provided with a small book from which a page is removed and turned in with the order on all demonstrations closed. This page gives the customer's name and address, the date the trial was installed, the number of calls, and the date closed. The customer's name and address are also written on the stub for the salesman's record.

Standings in the contest are shown on a large blackboard each Saturday at the general sales meeting.

3 Apollo Salesmen Will Win Bermuda Trip

NEWARK—Three salesmen for the Apollo Distributing Co., Crosley distributor here, will be given a six-day cruise to Bermuda with expenses paid, as grand prizes in the sales contest which ends June 30.

Other prizes in the \$5,000 contest include: Crosley "Five" radios, men's suits, Elgin watches, shoes, Ronson lighters and cigarette cases, hats, and shirts.

Sales of Sheldovar electric refrigerators in this territory so far this year exceed those of any previous season, according to Fred Goldberg, Apollo president, who states that the company is also looking forward to a record-breaking radio season.

GERSHWIN

to
Syncopation

The Weatherhead catalog of modern refrigeration valves and fittings is yours for the asking. Send a postcard to The Weatherhead Company, 632-714 Frankfort Avenue, Cleveland, Ohio.

So Weatherhead is to REFRIGERATION

New G-E Radio Line Has 18 Models; 'Focused Tone'

SCHENECTADY—General Electric's new radio line, embracing 18 "Focused Tone" metal-tube receivers and featuring a colored tuning control, automatic frequency control, and a silent tuning control, was recently shown to G-E distributors in a nation-wide series of meetings conducted by R. J. Cordiner, manager of the radio division, and E. H. Vogel, radio sales manager.

The line includes eight table models, eight consoles, and two radio-phonographs, built around five basic chassis using 6, 7, 8, 12 and 15 tubes. All of the sets, Mr. Cordiner reports, are equipped for both standard broadcast and short-wave reception and several have extended tuning ranges for ultra-short waves. Also listed are five models for the unwired home.

One set, the 15-tube deluxe model, with complete service from 150 to 70,000 kc., provides what G-E describes as the "most extensive coverage of any home receiver available today."

The color tuning control of the new models constitutes a "Colorama" dial which changes from red to green when the set is tuned to a station. With the automatic frequency control, as the dial pointer nears the frequency of a strong signal, the tuning circuit automatically swings into sharp resonance. The silent tuning control is provided so that the speaker may be cut out while the set is being tuned from station to station and silence maintained until the "Colorama" dial turns green for the new station.

Among the other features included in the line are the sentry box, metal tubes, stabilized dynamic speaker, sliding-rule scale, music-speech control, and a new local-station personalizer which is located directly below the broadcast tuning scale and identifies the points where American broadcast stations most prominent in each section of the country can be found.

Cabinets were styled by Ray Patten in collaboration with furniture designers, Mr. Cordiner says.

Novel Window Displays Aid G-E Dealer's Sales

BEAUMONT, Tex.—Two effective window displays in which timeliness and imaginative appeal were linked to focus attention of passerby on General Electric refrigerators, were features of the spring sales promotion campaign of the Gulf States Utilities.

In one display the figure of a whistling, overall-clad boy with a fishing pole over his shoulder and a dog at his heels, was part of the spring scene setting in which a Monitor top refrigerator and cards featuring its cold capacity and economy of operation, were arranged. A sign-post on the fence in the background bore the following message:

"It's spring and time to change to the modern convenience of electric refrigeration."

Playing up the hot-weather need for modern refrigeration, display cards in the second window portrayed a polar bear headed for the cooled interior of an open refrigerator, and an Eskimo waving a white flag in surrender to the heat. Advertising in this window repeated the cold capacity, low operating cost theme.

Indicative of the utility's sales progress this season, is the fact that during the first week of the annual Sweepstakes contest, which opened recently, 14.7% of the quota set for the entire campaign was reached, according to company officials.

Brazilian Dealer Has Sold Half of 10,000 Quota

CLEVELAND—More than half of the 10,000 unit quota which is the goal of the 3-year sales drive instigated by Cias. Associados, General Electric distributor of Brazil, was reached during the first 15 months of the campaign's duration, according to reports received here recently.

The activity is divided into six periods, comprising three four-month, and three eight-month drives, each with a set quota. The four months' campaigns are set for the hot seasons, from November to February, and the eight months' drives extend from March to October.

In the second campaign which ended Feb. 29, 2,029 units were sold. Quota for the period was 1,897. The company is affiliated with the American & Foreign Power Co.

Crosley Apartment Division Moves to New Offices

BROOKLYN, N. Y.—New offices have been leased for the Brooklyn apartment house sales division of the Crosley refrigeration department in Brooklyn Progress Blue Print Bldg.

Wisconsin Group Hears Reports of Improved Sales Standards

MILWAUKEE—Members of Wisconsin Radio, Refrigeration and Appliances Association heard reports of improved standards in the refrigeration industry at the regular meeting of the association held in the Knickerbocker Hotel June 10.

Other recent meetings of the group include a pep meeting attended by 376 members, four breakfast meetings during April, and a meeting of the Milwaukee Electric Refrigeration Bureau.

5-Day May Sales Beat Whole Month in '35

PITTSBURGH—More business during five consecutive days in May of this year than in the entire corresponding month in 1935 is the record established by Anchor Lite Appliance Co., distributor of Crosley refrigerators, washers, irons, and radios, reports H. W. Goldstein, president.

May sales, Mr. Goldstein says, are almost 200% ahead of any month in 16 years.

Alabama Dealers to Get \$5 Bonus on Range Sales

BIRMINGHAM, Ala.—To encourage dealers sales of electric ranges and water heaters in this state, the Alabama Power Co. has inaugurated a cooperative program in which dealers receive \$5 on each range sold, and \$7 on each water heater, in addition to the regular profit on these appliances.

Indications of the early success of the plan are found in the May sales reports, in which of a total of 539 range sales in the state, 115 were dealer sales, and of 292 water heater sales, 29 were made by dealers.

Hartford Dealer Moves To New Headquarters

HARTFORD, Conn.—Modern Home Utilities, Inc., G-E distributor, has moved its Hartford showroom and office from 125 Ann St. to new and larger quarters at Pearl and Ford Sts.

This company maintains main offices in Waterbury. Stanley P. Bang is Hartford manager.

Iowa-Nebraska Utility Opens Dishwasher Drive

LINCOLN, Nebr.—Plans with a double objective—to increase sales of General Electric dishwashers, and of electric water heaters—were inaugurated recently by the Iowa-Nebraska Light & Power Co.

Scheduled to extend for a year, the drive is being backed with intensive promotions, which include window displays, direct mail, and newspaper advertising.

To display effectively a dishwasher in a suitable setting, the company has installed a model kitchen in its store here. Ada Holm, home economist, is in charge of the kitchen. Direct mail pieces, over her signature, are sent out to a selected prospect-list in this city. A similar mailing goes out to lists throughout the company's territory.

J. F. Bryan, of the G-E dishwasher division has conducted a series of meetings for the utility's employees, held at key centers in its territory. A special employee sales campaign has also been started.

The campaign is under the direction of Stanley Taber, merchandising manager of the utility, and R. M. Oliver has charge of its advertising.

Crosley Ships 24 Cars Of Display Material

CINCINNATI—Twenty-four railway express cars carrying a total of 287,000 lbs. of advertising displays were sent by Crosley Radio Corp. to 101 distributing points in the United States for redistribution to the dealers last week.

In the shipment were 12,500 displays, reproductions of a full-sized refrigerator of five-cu. ft. capacity. On a swinging panel are pictured articles of food in the interior compartment of the refrigerator cabinet. The reverse side of the panel shows the same articles of food in the "Shelvador" racks to demonstrate the additional storage capacity which Crosley claims in its slogan, "This Much More in a Shelvador."

An electrically operated device moves the panel back and forth, while the reading matter tells the advertising message.

The Railway Express Agency sent three experts to the Crosley factory, where they worked for five days planning and organizing the shipments so that they could be handled with the greatest dispatch and at the most favorable rates, company officials reported.

Still Time to Share the Profits ON THIS 127% FASTER-SELLING LINE

Dealers Everywhere Going to Town With New STEWART-WARNER Because It Has More of the Features Housewives Want

If you've watched others walk away with the profits on Stewart-Warner's skyrocketing sales—cut yourself in now for the climax of the season! There's still time—still money to be made on this line that's the stand-out of the year because of its spectacular 127% increase over last year's sales. Your prospects, too, will be delighted with the exclusive Stewart-Warner SAV-A-STEP—the swinging triple-shelf that turns all space into "front" space, saves steps and saves current. They'll go for SLID-A-TRAY,

the new hidden rearranging shelf—and TILT-A-SHELF—and the brand new illuminated airplane dial freezing control—and all the other work-and-money-saving features of this new Stewart-Warner. Sales are still hitting new highs for Stewart-Warner dealers—so do something now about getting your slice of the business. Phone or wire your distributor now.

STEWART-WARNER CORPORATION CHICAGO, ILLINOIS

HERE ARE THE DISTRIBUTORS WHOSE DEALERS ARE DOUBLING LAST YEAR'S SALES

AKRON, OHIO Brown-Dorrance Electric Co.	DUBUQUE, IOWA The Home Supply Co.	MEMPHIS, TENN. Automobile Sales Company	ST. LOUIS, MISSOURI The Arophone Corporation
ALBUQUERQUE, NEW MEX. Chas. Ilfeld Co.	DULUTH, MINNESOTA Marshall-Wells Co.	MILWAUKEE, WISCONSIN Shadbolt & Boyd Co.	SALT LAKE CITY, UTAH United Electric Supply Co.
ATLANTA, GEORGIA Capital Electric Co. of S. E.	EL PASO, TEXAS Peterson Lumber & Paint Co.	MONROE, LOUISIANA Monroe Furniture Co., Ltd.	SAN ANTONIO, TEXAS Southwest Appliance Co.
BIRMINGHAM, ALABAMA Capital Electric Co. of S. E.	EVANSVILLE, INDIANA Small & Schelosky Co.	NASHVILLE, TENNESSEE Phillips & Buttfield Mfg. Co.	SAN FRANCISCO, CALIFORNIA Moore Electric Supply Co.
BLUEFIELD, WEST VA. Bluefield Hardware Co.	FORT WAYNE, INDIANA Schlatter Hardware Co., Inc.	NEWARK, NEW JERSEY Wholesale Radio Equipment Co.	SCRANTON, PA. D. T. Lansing Co., Inc.
BOSTON, MASS. Hunt-Marquardt, Inc.	HARTFORD, CONN. Wood, Alexander & Co.	NEW ORLEANS, LOUISIANA Max Barnes Furniture Co.	SEATTLE, WASHINGTON Domestic Utilities, Inc.
BUFFALO, NEW YORK Buffalo Nipple & Machine Co.	HOUSTON, TEXAS Star Electric & Eng. Co.	NEW YORK, NEW YORK Wholesale Radio Equipment Co.	SPOKANE, WASHINGTON Alemite Co. of the Northwest
CHARLESTON, WEST VA. R. H. Kyle & Co.	INDIANAPOLIS, INDIANA Mooney-Mueller, Ward Co.	NORFOLK, VIRGINIA Dix Bowers Co.	SPRINGFIELD, ILLINOIS The Bruce Co.
CHARLOTTE, N. CAROLINA Shaw Distributing Co.	JACKSONVILLE, FLORIDA Capital Electric Co. of S. E.	OKLAHOMA CITY, OKLA. Southwest Radio & Equipment Co.	SYRACUSE, NEW YORK City Electric Company
CHICAGO, ILLINOIS Domestic Utilities, Inc.	JOPLIN, MISSOURI Joplin Auto Supply Co.	OMAHA, NEBRASKA H. C. Noll Company	TOLEDO, OHIO Baumgardner Distributing Co.
CINCINNATI, OHIO The Schneider-Shott Co.	KANSAS CITY, MISSOURI Stewart-Warner-Alemite Co.	PHILADELPHIA, PA. Philadelphia Distributors, Inc.	TROY, NEW YORK H. A. McRae & Co., Inc.
CLEVELAND, OHIO The Geo. Worthington Co.	KNOXVILLE, TENN. House-Hasson Hardware Co.	PITTSBURGH, PA. Brown-Dorrance Electric Co.	UTICA, NEW YORK Miller Electric Co.
COLUMBUS, OHIO The Geo. Worthington Co.	LAS VEGAS, NEW MEXICO Chas. Ilfeld Co.	PORTLAND, OREGON Alemite Co. of the Northwest	WHEELING, WEST VIRGINIA The Front Co.
DALLAS, TEXAS Radio Equipment Co. of Texas	LEWISTON, MAINE Northeastern Sales Corp.	PROVIDENCE, R. I. Good Housekeeping Shops, Inc.	WICHITA, KANSAS Stewart-Warner Products Co.
DENVER, COLORADO Stewart-Warner Sales Co.	LITTLE ROCK, ARKANSAS Brandon Company	RICHMOND, VIRGINIA A. R. Tiller, Inc.	WESTERN CANADA Hudson's Bay Company
DES MOINES, IOWA Lueth Hardware Co.	LOS ANGELES, CALIFORNIA C. A. Roesch & Co.	ROCHESTER, NEW YORK C. L. Hartmann Corporation	Calgary, Alta. Victoria, B. C. Vancouver, B. C. Saskatoon, Sask. Edmonton, Alta. Winnipeg, Man.
DETROIT, MICH. Morley Brothers	LOUISVILLE, KENTUCKY Bomar Mfg. Co.	SAGINAW, MICHIGAN Morley Brothers	

STEWART-WARNER
REFRIGERATORS

Sales Figures

\$2,000-\$3,000 Income Class Owns Largest Number of Refrigerators, Study of Nine City Surveys Shows

WASHINGTON, D. C.—"Consumer use" surveys conducted by the Consumer Market Section of the Department of Commerce in nine American cities have uncovered the following interesting facts regarding ownership and use of mechanical refrigerators:

In five out of the nine cities, more families reporting "no income" had mechanical refrigeration than families with incomes of \$7,000 and over.

In eight of the cities, the greatest number of refrigerators in use was in the income class between \$2,000 and \$3,000 (annual).

Home Owners Best Prospects

Home owners are best prospects for mechanical refrigeration, but there is a growing demand for this sort of equipment in rented quarters.

While more mechanical refrigeration proportionately is used in the higher income brackets, the actual number in use seems to indicate the \$1,000 to \$5,000 group as the biggest and best market.

Especially good is the income group between \$1,000 and \$3,000. The survey showed more than half the users of mechanical refrigeration in each city within these brackets.

Higher Income Market Saturated

More than 90% of the families without incomes, on the average, were without mechanical refrigeration—while 50 to 100% of the families in the highest income bracket had this type of equipment.

Covered in the survey were Austin, Tex.; Portland, Me.; Fargo, N. D.; Columbia, S. C.; Salt Lake City; San Diego; Trenton, N. J.; Racine, Wis., and Birmingham, Ala. With the exception of the last two, individual reports on all these cities have been previously published in ELECTRIC REFRIGERATION NEWS.

In addition to refrigerators, ownership and use by income classes of building materials, automobiles, heating apparatus, lighting facilities, fuel for heating, fuel for cooking, and installed bathing facilities are also studied in the survey, which was originally made in 1934.

'Sample' Test Results

While the surveys do not cover income and use of the specified goods among all the residents of the cities covered, "sample" groups were covered in the classification. Sizes of these "samples" run as follows:

Fargo, 21.2%; Columbia, 15.2; Austin, 13.3; Portland, 17.7; Salt Lake City, 19.0; Trenton, 13.7; Racine, 22.9; San Diego, 16.7, and Birmingham, 14.2.

That something other than climate is the determining factor in the purchase of a mechanical refrigerator is shown by the fact that Fargo, a city which in recent times has gained something of a reputation for cold weather, showed the highest percentage of refrigeration saturation, 28%.

Fargo Leads in Wired Homes

Fargo was highest also in percentage of families using electricity for lighting—99.7%. But that this, also, is not the determining factor in refrigerator buying is indicated by the fact that the lowest city in saturation, Trenton, which shows only 9.3%, has more than 95% of its homes electrically lighted.

Percentages in the nine cities, as far as refrigeration saturation is concerned, are: Fargo, 28.2; Salt Lake City, 26.5; Columbia, 18.3; Birmingham, 17.8; Portland, 16.8; Austin, 16.1; San Diego, 16; Racine, 14.4, and Trenton, 9.3.

Use of electricity for lighting in the cities studied ranged all the way from 99.7%, in Fargo, to 66.8%, in

Columbia. Individually, the cities ranked as follows:

Fargo, 99.3; Salt Lake City, 99.5; San Diego, 99.3; Racine, 99.2; Trenton, 95.3; Portland, 95.0; Austin, 82.7; Birmingham, 79.4, and Columbia, 66.8.

Studies by Income Groups

In three cities—Austin, Racine, and Trenton—families with incomes of \$5,000 to \$7,000 had proportionately more mechanical refrigerators in their homes than their richer neighbors with incomes of \$7,000 and over. In Columbia, however, every family with an income of \$7,000 or over had mechanical refrigeration.

For the families with income of \$7,000 or over, the percentages ranged from Columbia's perfect figure to 53.3%, in Racine. Individual figures are:

Columbia, 100%; Fargo, 85.7; Birmingham, 84.6; Salt Lake City, 84.4; Portland, 77.8; Trenton, 70.0; Racine, 63.6; San Diego, 60.7; Austin, 53.3.

The Low Income Group

As would normally be expected, the income group between \$1 and \$500 ranked lowest in use of mechanical refrigeration. Highest percentage in this class was only 6.4%, and was attained in Portland. The other cities ranged between 1.4, in Columbia, and 5.4, in Salt Lake City.

But that there may be overlooked business opportunities in the "no income" class is indicated by the survey's showing that, in five of the nine cities, consumer use of refrigeration in this group ranged close to 10%, and in some cases went as high as 18.2.

The five cities which ranked near or above the 10% mark, and their "no income" group saturation points, are:

Columbia, 18.2; Fargo, 15.7; Austin, 15.6; Salt Lake City, 11.0; and San Diego, 9.7.

The "no income" group, of course, includes families at both ends of the social scale, financially speaking—both families who are living on savings accumulated over earlier periods, and other families whose only support is the dole.

Potency of this group in some cities, at least, is shown by the fact that in Racine, for example, more than twice as many users of mechanical refrigerators—in actual numbers—were found in it than in the \$7,000 and over class. Number of families in the "no income" class, however, was greater than the highest income class, which may account for the difference.

Percentages in the nine cities, as far as refrigeration saturation is concerned, are: Fargo, 28.2; Salt Lake City, 26.5; Columbia, 18.3; Birmingham, 17.8; Portland, 16.8; Austin, 16.1; San Diego, 16; Racine, 14.4, and Trenton, 9.3.

Use of electricity for lighting in the cities studied ranged all the way from 99.7%, in Fargo, to 66.8%, in

Other cities in which the "no income" class outnumbered the \$7,000 and over class in mechanical refrigeration usage were Birmingham, San Diego, Fargo, and Trenton.

\$1,000-\$3,000 Best Market

Probably the most fertile field for refrigeration sales, the surveys show, is the class with income between \$1,000 and \$3,000. More than half the users of mechanical refrigerators in each of the nine cities were within these income brackets.

Percentages on this run from 53.5 for Austin, the lowest, to 65.5, for Birmingham.

Breaking down the income classifications still further, it appears that for volume business, the refrigerator dealer may well confine his efforts to the families with income between \$500 and \$5,000—particularly those between \$1,000 and \$5,000.

When the field is widened to include these classes, it is found that the number of users ranged from 73.3, in Racine, to 90.4, in Fargo.

City-for-city figures were: Racine, 73.3; Portland, 83; Austin, 83.1; Trenton, 85.5; Columbia, 87.4; Salt Lake City, 88.0; Birmingham, 88.6; San Diego, 90.1; and Fargo, 90.4.

Factor of Home Ownership

The survey contained some interesting information on the relationship between home ownership and use of refrigeration. While in every one of the nine cities the owner-occupant dwellings with mechanical refrigeration were greater, proportionately, than tenant homes, the Salt Lake City survey showed only a slight margin for owner-occupants.

In this city, with general use of 26.5%, owner-occupant use of mechanical refrigeration was only 26.7%, against a figure of 26.4% for tenant-occupied dwellings.

A much wider difference, however, was evident in other cities, ranging up to Portland, which in owner-occupant use of this equipment outstripped tenant use by about two to one. The exact percentage in this city was 26.2% saturation in rented homes.

Portland, with the lowest number in percentage of single family homes, ranked sixth in the list in use of mechanical refrigerators. Austin, with the greatest number of this type of dwelling (89.1%) ranked seventh.

Salt Lake City and Fargo, the two largest users of mechanical refrigeration, show much the same type of occupancy. Salt Lake City has 73.9%

market in the nine cities for this type of equipment. While range manufacturers and distributors may preen themselves on the comparatively good job done in Salt Lake City, comparative figures for other cities show that considerable of a selling job remains to be done before ranges are accepted to the same extent as refrigerators.

While there is doubtless some relationship between income and the use of electric ranges, the same as for electric refrigeration, some indication of the selling job in store for range promoters may be gained by the observation that, in most cities, the income classes best able to afford such equipment ranked a good distance from the top in the use of them.

In some of the cities studied, range ownership evidenced itself in income classes as low as \$1,500 yearly. In most other cities, the majority of owners were between \$2,000 and \$5,000.

Difference in Figures

Biggest difference between refrigerator and range figures, however, cropped up in the \$7,000 and over class. This group, best able to afford such conveniences from an income standpoint, normally ranked quite high in refrigerator saturation. In some cities, however, there wasn't a range in the entire income class.

Individual reports on each of the nine cities are available from the Bureau of Foreign and Domestic Commerce of the Department of Commerce. They were conducted under the supervision of Ada Lillian Bush, chief of the consumer market section of the marketing research and service division.

Reports on surveys made in nine other cities—Burlington, Vt.; Casper, Wyo.; Des Moines, Iowa; Erie, Pa.; Frederick, Md.; Lansing, Mich.; Paducah, Ky.; Portland, Ore.; and Oklahoma City—are being compiled at the present time. These will be published in a single volume.

Home Building Shows Gain in 5 Months

WASHINGTON, D. C.—Building permits, and commitments to insure home mortgages by the Federal Housing Administration, two barometers of residence construction, recorded the upswing of residence building during the first five months of 1936, FHA officials report.

In April of this year, 97 cities totaled one, two, three, and four-family dwellings constructed in excess of \$100,000 in each locality, as compared with the 72 enrolled in the "six figure" group in March. In April, 1935, only 32 cities were able to show totals in excess of \$100,000.

An indication of an upturn in the month of May is seen by FHA officials in the \$7,702,000 of mortgages accepted for insurance by the administration during the last week of May, bringing the total for the month to \$35,399,760, a new high. This was a 22.7% or \$6,550,106 increase over April's top record.

Two-Million Dollar Class

New York, Detroit, and Los Angeles were again the only cities with more than \$2,000,000 of residential construction each for the month of April, but Washington moved into the "million dollar" class for the first time, FHA officials report. Philadelphia, with a total just over a million dollars for the month, held its own.

In April, 1935, only four cities were able to list half million dollar residential totals, as compared with the ten cities with that amount in March of this year, and 11 in April.

Among the states most active in residential building, according to FHA reports, are California, with 16 cities with totals in excess of \$100,000; Pennsylvania, with seven; Massachusetts, with six; New York and Texas, with six; Illinois, New Jersey, and Ohio, with five; and Florida and Wisconsin, with four.

Meadville Leads the Way

The longest stride forward was registered by the little city of Meadville, Pa., whose April, 1936, total is \$676,400, compared with the \$3,600 for April, 1935. However, Meadville got its greatest boost from the construction of the Meadville housing project, a large scale housing development now being built under the terms of FHA's insured mortgage system, but not built with federal funds.

Modernization and repair notes reported by private financial institutions during the week ending May 29 numbered 7,530 amounting to \$3,465,288, an increase of 691 notes and \$453,610 over the preceding week. This makes a grand total of 1,056,985 notes amounting to \$382,784,205.

During the week there were 1,972 mortgages accepted for insurance, under the insured mortgage system, amounting to \$7,702,045. This makes a grand total of 73,538 mortgages accepted for insurance amounting to \$296,171,831.

Large scale housing projects which have been accepted for insurance up to the May 30, total \$33,262,158.

Comparative Figures on Use of Refrigerators and Electricity in Nine U.S. Cities

	Austin	Portland	Fargo	Columbia	Salt Lake City	San Diego	Trenton	Racine	Birmingham	
	Refrig- erators	Elec- tricity	Refrig- erators	Elec- tricity	Refrig- erators	Elec- tricity	Refrig- erators	Elec- tricity	Refrig- erators	Elec- tricity
\$7,000 & Over	53.3	100.0	77.8	100.0	85.7	100.0	100.0	84.4	100.0	100.0
\$5,000-\$7,000	63.9	100.0	60.4	100.0	72.7	100.0	100.0	79.3	100.0	100.0
\$3,000-\$5,000	51.5*	100.0	44.7	100.0	69.9	100.0	100.0	75.0	100.0	100.0
\$2,000-\$3,000	33.2	99.5*	25.5*	99.8*	47.0*	100.0	100.0	59.8*	100.0	100.0
\$1,500-\$2,000	22.4	97.6	16.5	99.6	32.1	100.0*	100.0	40.5	100.0	100.0
\$1,000-\$1,500	12.3	96.7	11.7	99.6	19.9	100.0	100.0	25.8	99.8	11.2
\$500-\$1,000	3.6	81.5	7.6	98.4	11.4	100.0	4.6	71.9*	11.8	99.7
\$1-\$500	1.6	49.1	6.4	94.1	4.7	97.6	1.4	32.4	5.4	98.7
No Income	15.6	75.6	7.2	94.2	15.7	100.0	18.2	52.3	97.5	9.7
All Classes	16.1	82.7	16.8	95.0	26.2	99.7	18.3	66.8	26.5	99.5
								16.0	99.3	9.3
								9.3	95.3	14.4
								99.2	17.8	79.4

*Indicates group containing greatest number of users of electricity and refrigerators in each city.

COPELAND

Around the World

With George F. Taubeneck

Tropical Countries Offer Market For Air-Conditioned Beds

Java Thickly Populated, All Land Cultivated; People Are Industrious, Peaceable and Friendly

The Dutch Own Java—Chinese Run It

Java, as you undoubtedly know, is a Dutch possession. It has been an extremely valuable one for Holland, for the high fertility of the soil and the industry of the natives have yielded rich crops of tea, rubber, and sugar for decades.

The Dutch have been excellent administrators, have cleaned up and built up the country, while allowing the Javanese to live their own lives in their own accustomed ways, worship in their fashion, and pay homage to their own kings. Because of Dutch work in sanitation and epidemic control, the population has jumped 30% in less than two decades.

At present Java is in the lowest stages of depression, as far as trading is concerned. Reasons: stagnation of world trade, because of tariff barriers and the recent world-wide slump; and the Dutch guilder still being on the gold standard.

As a sample of what this means to Java, it might be pointed out that of the 200 sugar factories in the country only 40 opened their doors at all last year.

Even so, the vast population—Java is the most densely populated land in the world—is living much the same as it did during boom times. There is no unemployment, no dole or "relief," no make-work projects, no New Deal; and everybody eats.

Here's how it's done: (1) labor-saving machinery, especially agricultural, is not allowed to enter the country; (2) only natives are permitted to own the land.

The Javanese are by nature hard workers. Always they are on the move. A road in Java, or a street in a Java city, is a memorable sight, because of the never-ending lines of natives walking with loads on their heads, dog-trotting with loads strung on each end of shoulder poles, driving ox-carts or pony carts with loads, riding bicycles, riding motorcycles.

It seems that they never stop moving. And invariably they are going somewhere with something.

A native will walk a dozen miles to sell a few fish for a few cents, and then trudge back home. They will labor hard all day in the rice fields or sugar cane or tobacco plantations, for maybe 10 to 15 cents.

With all their industry, the Javanese are happy-go-lucky, improvident people. Hence, unless the Dutch government maintained its rule of Java for the Javanese, Chinese and Europeans would soon own it all.

Being poor business men, the Javanese would allow their land to slip through their fingers, if permitted. The Chinese would trade them out of it, gamble it away from them, or lend them money (which they never are able to repay) and take land put up as security away from them.

Or, the Europeans might buy it up, divide it into estates, with hunting grounds and such, and retire valuable land from production. As it is, practically every Javanese family owns its patch of land, works hard on it, and makes a living for itself, in good times or bad. And every available square inch of soil is under cultivation.

The big sugar, rubber, tea, and coffee plantations are composed of small plots leased from the owners, and on which the owners live.

Oil and gold, of course, are well controlled by Dutch interests. The Royal Dutch Shell corporation (well known in America, as well as the rest of the world) is partly owned by the Dutch Crown.

Incidentally Standard Oil of New York (Socony-Vacuum) has properties in Java.

Down there its filling stations use the trade name, "Colonial." Shell and Standard Oil have been the two gasoline, or petrol, or benzine, vending concerns in evidence everywhere on this trip. Shell always has the same name. Standard in addition to the "Colonial" mentioned above, is known as "Plume" in some places.

Being masters of the science of

handling water and building canals, the Dutch have watered Java thoroughly with a marvelous interlocking irrigation system.

When travelling by car in the interior, wide canals generally parallel the roadway; whereas on trains one is continually crossing culverts, and seeing man-made waterfalls and sluiceways. Invariably the water is a chocolate brown. Travelers must be

(Continued on Page 6, Column 1)

Modernism in Soerabaya



Typical refrigerator dealerships in Soerabaya, with a sidelight on the city's modern touch. Left: General Electric dealership headquarters. Center: Street scene in the city. Note the evidences of modernism in buildings, highways, and transportation. Right: Soerabaya's Electrolux dealer occupies this interesting location.

Editor Will Attend International Congress of Refrigeration

This week Editor George F. Taubeneck will attend the International Congress of Refrigeration (June 16-22) at The Hague where he will present a paper on "The Development of the American Household Electric Refrigeration Industry." His paper will be published in an early issue of the News.

On Saturday, May 30, Mr. Taubeneck left Paris for a quick tour of a number of European cities including Rome, Florence, Milan, Venice, Vienna,

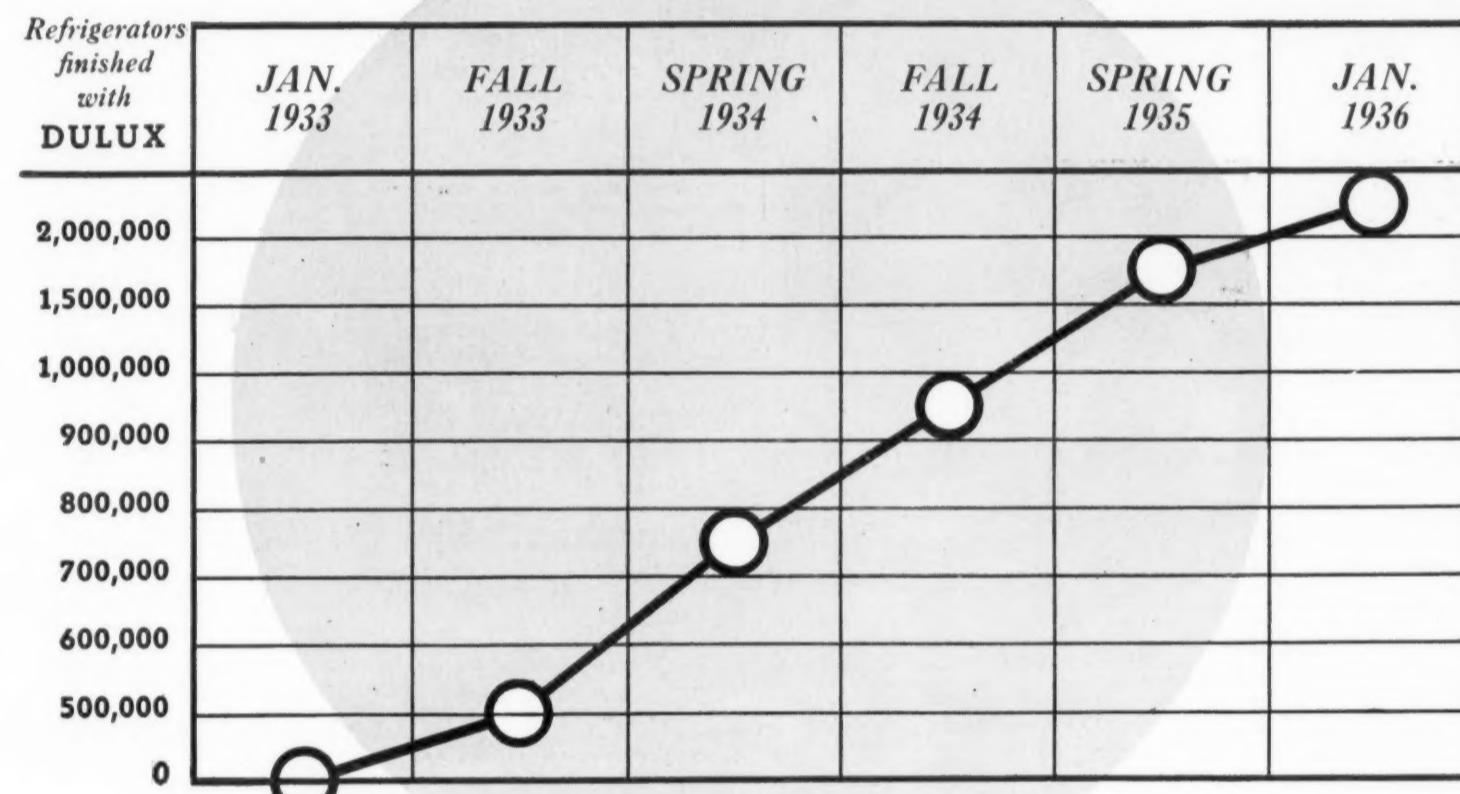
Budapest, Zurich, and Geneva. After the Congress he will visit Amsterdam, Berlin, and Stockholm, arriving in London about July 12.

His sailing date has not been definitely decided but he will probably return on the Queen Mary which leaves July 22, arriving in New York July 27.

The editor's story about Java, started last week, is completed in this issue. In the next three issues (June 24, July 1 and 8) he will tell about Singapore, Penang, Rangoon, and Calcutta.

DULUX...the modern refrigerator finish

Refrigerators finished with DULUX



...STEADY
CONSISTENT
GROWTH!!!

Let DULUX on refrigerators help to carry your sales to a new high

DUPONT introduced DULUX for refrigerators in January, 1933. Today, this outstanding finish for refrigerators is on more than 2,000,000 household mechanical boxes.

Success in producing this better-looking, longer-lasting and more economical finish points the way to success in selling more refrigerators. It can be profitable for manufacturers and dealers to join with those who are finding that a DULUX finish helps to make refrigerator selling easier. Here are the three main points that make DULUX important in closing sales:

1. DULUX is a finish of exceptional brilliance and beauty...with texture, depth and gloss.

White DULUX gives the pure, clean, sanitary finish women want. Its beauty is a joy to their eyes.

2. DULUX retains its original gloss and color and beauty much longer. Its white stays white.

3. DULUX has remarkable durability in the face of all the hardships that a refrigerator meets in the home.

Beauty, durability and economy to a greater degree—that's what you can offer to housewives through DULUX. Profit by a woman's desire for its long-lasting beauty in her kitchen.

For practical help in using the DULUX sales points, write for "Selling Made Easier by DULUX," a booklet that gives more

details about this ideal, modern finish for refrigerators.

Address E. I. du Pont de Nemours & Co., Inc., Finishes Division, Wilmington, Delaware.



DULUX

REG. U. S. PAT. OFF.

for refrigerators

Scenes at Sea



Aboard the S.S. Marella. Above: Morning ice cream, served daily at 11 a.m. Below: George Taubeneck takes advantage of the mild morning hours to get a surplus stock of violet rays and suntan.

Around the World

With George F. Taubeneck

(Continued from Page 5, Column 2)

Dutch inhabitants all live well, with nice homes, luxurious clubs, well-appointed hotels, and plenty of servants.

When you get right down to it, though, it's the Chinese who really run the country. They do 95 per cent of all the trading in Java; and are the ones who have the real contact with natives.

They work on small margins, pay their help little, settle their bills promptly, always do business at profit, add to the family fortune from generation to generation, and eventually become extremely wealthy. In the cities some of the Chinese stores are quite up-to-date.

Most of these Chinese have never seen China, and cannot speak even one of the manifold Chinese dialects or languages. They were born in Java, and so were their immediate ancestors. It is to these industrious people that Java really owes its development, its peace, and its state of well-being.

Air Conditioned Beds

On our trip through Java we traveled by automobile, train, and airplane.

Javanese Transportation



Upper left: A street scene in Djocjakarta. Everybody, it seems, rides bicycles in Java. Right: Terraced rice fields. Lower left: Waiting for the train in the railway station at Bandoeng. Right: A high speed train, in the station at Batavia, Java's capital city.

it be simpler—and much cheaper—to sell air-conditioned beds? POWEL CROSLEY, please note.

Sleeping under canopies was not the only thing we had to get used to in Java. There was the matter of the bathrooms.

Our first sight of the bathroom to a Javanese hotel suite—every "room" carries with it a big bathroom, a dressing room, and a sort of semi-enclosed porch, in addition to the bedroom—stumped us completely.

The toilets have no liftable wooden seats; there is a row of long-necked bottles filled with water; and what appears to be the tub is four feet high, about 30 inches in diameter, and would be about the right size for a three-months-old baby.

We later learned: (1) that wooden seats are rapidly eaten away by termites, so they have been eliminated entirely; (2) the water bottles are used in lieu of toilet paper; and (3) one does not try to get into the high, tiny "tub," but instead one dips a bucket full of water out of it and douses oneself with it.

First time we tried that we got a shock, followed by a tingling, numb sensation, as if our entire body were a "crazybone," and we had struck it.

A Malay house boy wakes you in the morning at these hotels, and serves tea. After that there's breakfast. And then lunch, or "rice stoefel."

This last is a murderous, suicidal feast consisting of rice, flavored and savored and piled high with 28 or more (we're not kidding) varieties of meat, vegetable, and fruit concoctions.

You start with a plate of rice. Then here come the boys, a line of them extending clear across the room to the kitchen door. Each bears something else to put on top of the rice.

The Dutch seem to survive this orgy; but it's tough on visitors. After wading through a rice-stoefel (or rijstafel), one understands why these hotels do not serve dinner until 9:30 or 10 o'clock in the evening.

Bandoeng

Bandoeng was built by Europeans who sought comfort. It is high in the mountains, 2,300 feet above sea level, and has an almost bracing climate. Less than 30 years old, it is most modern, clean and sanitary. The shops will remind the American traveller of those at Miami Beach.

Many government offices are here, and all are handsome. Roads are good, hotels excellent.

Even though we couldn't find anything to eat in Bandoeng, we loved it. During our wanderings the native were delightfully friendly, and we had any number of no-savvy conversations, always ending in mutual grins and laughter.

Batavia

Capital city of the Dutch East Indies, Batavia really consists of several cities.

The port is Tandjung Priok. Old Batavia, built in true old Dutch style, is the business center, and has the Chinese quarter. Weltevreden (meaning "satisfied") is a European residential town, with beautifully shaded streets, fine dwellings, and modern shops. Buitenzorg (meaning "care-free") is the residence of the Governor General of the Dutch East Indies, and has the famous Botanical Gardens which every visitor to the city has seen except the writer.

One of the most interesting sections of Old Batavia is the fish market, especially when the Malay fishing fleet has returned. Near the old arched gate down there is a sacred cannon, half buried in the ground, with a breech sculptured to represent a clenched fist. Native women (and, we heard, an occasional European!) straddle this gun and leave floral offerings, hoping to get in a family way. Another belief is that some day the mate to this cannon (which now lies near Serang in Bantam) will arrive, and when that happens, Java again will be ruled by the Javanese.

Batavia has a population of about 550,000, with 50,000 Europeans and 100,000 Chinese.

Semarang

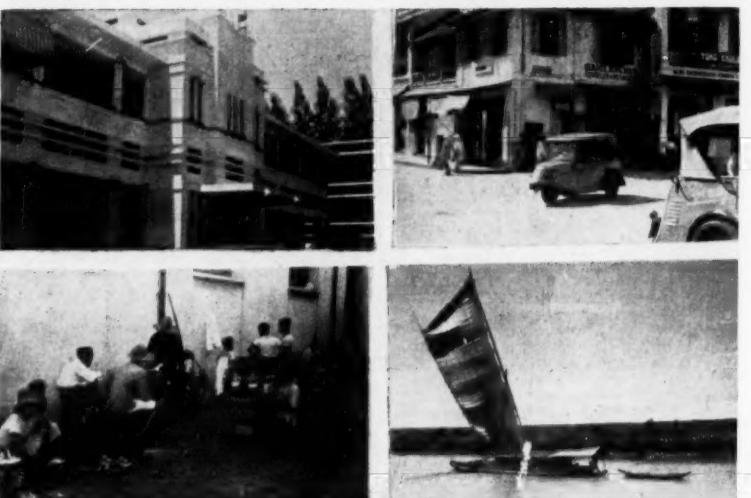
Semarang is the producing and exporting center for the pods of the ceiba tree, the silky fibers and seeds of which are used in making Dry-Zero insulation and kapok.

The dryer climate of this section makes cultivation of the ceiba tree more successful than in other parts of Java. Natives weave these fibres, and make pillows of them.

Burns-Philip, the Australian shipping firm which owns the *Marella*, on which I arrived in Soerabaya, handles most of the output of ceiba fiber.

Semarang is fourth largest town in Java, with a population of 200,000. It is beautifully located on low hills

Scenic Soerabaya



Upper left: Headquarters of General Netherlands-India Electriciteit Mij, Soerabaya. This utility serves practically all of Java with the exception of Batavia. Right: Soerabayan street scene. The three-wheeled Ambo cars (Japanese made) are quite popular here. Lower left: Lunch time in Soerabaya. Right: A canal boat in the harbor of Soerabaya—really a drowned river mouth, George Taubeneck says.

which rise gently from the coast, and which command an excellent view of the harbor—which is really a drowned river mouth. Larger ships must anchor in the roadstead, sending cargoes and passengers ashore by lighters.

Soerabaya

Most important port in Java, Soerabaya is a busy place despite the heat and humidity. Its population of 380,000 Malays, Chinese, and Europeans seem constantly to be on the jump.

As in the case of Batavia, the harbor (a deep one, providing wharfage for big vessels) is several miles from the city proper. These miles are covered by a good asphalt road, lined on both sides with dog-trotting Malays of every racial division.

Soerabaya was our first sight of Java, and we were immediately intrigued. The combination of the Old World natives and the New World buildings, of the unhurried ancient life and the bustling commercial enterprise, of the ox-carts and put-putting three-wheeled motor cars, is well-nigh irresistible.

Solo & Djocja

Two inland cities which are really Java, with scarcely a trace of the modernizing Dutch, are Solo (Soerakarta) and Djocjakarta (Djocja). Each are capitals of little monarchies, with sultans who live in walled palaces (within those walls they have absolute power of life and death), hold wanly brilliant courts, live with what splendor they can, and make the people pay through the nose.

Naturally the Dutch don't let this monarchical business go too far, and at each capital there is a Resident (called "Big Brother" by the Sultans, and permitted to sit on their left at functions) who runs the place politically.

But it is said that if these monarchies were not allowed to exist, and the sultans to play their little games of pomp and circumstance, the people would rebel. The sultans, particularly

the Soesoehoenan of Solo, who is the spiritual chief of the Mohammedans in Java, have sacred significance.

Moreover, the sultans marry so many wives that it is said two-thirds of the subjects have relatives at court.

One way to know when you have arrived within the borders of these sultanates is to notice the roads. If they aren't in good condition, you are in a sultanate. (Taxes all go to maintain the extravagant courts).

Solo has a population of some 90,000, of which about 1,500 are Europeans. Just where these 1,500 Europeans keep themselves, we never did find out; because we saw only four, although we spent the night there.

Anyhow, Solo is thoroughly Javanese; and if any city which seems to be practically without illumination can be said to be colorful at night, Solo is that city. Bicycle bells ringing, the steady shuffle and patter of rhythmically moving bare feet, the childlike curiosity of the natives, the rattle of oxcarts and sados (two-wheeled pony carts—contraction of "dos-a-dos"), all make for otherworldliness.

Before arriving in Solo, the lighting system of our car passed out, and while the mechanic was trying to fix it, the writer wandered out of the rain into a native home, where a man was playing a set of tuned wooden bones—not unlike a marimbaphone in tone. This music had a definite pattern, a recurring theme with variations, and a species of rhythm; but no melody.

To drive to Djakja from Solo, one gets up before dawn. All travel in Java begins at daylight, it seems, even including the famous K. L. M. (using American Douglas planes) airways. The explanation is that from 11 a.m. until evening it's too hot to travel. That system was pretty rough on your Uncle George, but there was nothing to do but bow to it.

But it really was worth it to see the people trudging along the highways in such great numbers. In Java one is never out-of-sight of human beings. The men aren't large or strong, but they seem to have great endurance. Women are small, neat, well-formed. (Concluded on Page 7, Column 1)

Temples and Tapestry



Upper left: George Taubeneck inspects some of the 1,300 sculptures which line the main and inner balustrade walls of the Borobudur temple, near Semarang. Right: This Javanese girl is justly proud of her home-made batik. Lower left: It's wash day in Batavia; and the natives do all of theirs down on the river. Right: A typical Javanese road. "Always teeming with people," Mr. Taubeneck says.

Busy Business Men

Two busy leaders in the refrigeration business in Soerabaya, Java. Left: T. P. Timmerman of General Netherland-Indies Electriciteit Mij. Right: O. C. Picard of N. V. Carl Schlieper Handel Mij, Electrolux dealer for Java. This is one of the biggest mercantile houses in the country.

(Concluded from Page 6, Column 5) charmingly dressed, and rather lovely withal. Men wear knee-length skirts, nothing above the waist, and funnel-shaped straw hats.

The girls and women wear colorful wrap-aroundings of gaily tinted muslins and silks, or patterned skirts with tight-fitting jackets of a gauzy material like georgette, in pastel shades. Their dark brown hair is drawn simply back to a knot on the nape of the neck, without a hint of a wave or curl.

Women do most of the work in the rice fields; and always do the planting (there is religious significance, having to do with fertility, in this custom).

A man may have more than one wife, if he can afford to support a plurality. They change wives, too, with complacent frequency. If a woman goes through life with only one husband, she is considered unattractive, and somewhat disgraced.

Djocjakarta is a big city, with 100,000 inhabitants. It is the center of native arts and crafts, and some of the stores and the permanent exhibition are well worth a browse. The handworked silver impressed us especially. You can watch batik work in progress there, as well as other native arts, including leather and brass work.

Native customs continue peacefully in Djocja, oblivious of the occasional white man. Within the city is the walled "Craton" of the Sultan, covering a square mile and numbering 17,000 persons inside its confines.

From Djocja one goes to Bandoeng by train, a clean decent train, but one which stops at almost every crossing. Inasmuch as Javanese cities are only a few miles apart—one is rarely outside the sight of a town or village—the train seems alway to be starting and stopping.

But what an interesting trip! The train puffs and blows up a winding mountain trail, through tree ferns and rubber trees and luxuriant palm trees, past natives at work in rice fields and tea, coffee, sugar, rubber, tobacco, and fruit plantations, and by some lovely scenery. Smoking, smouldering volcanoes form the background. Up the sides of these volcanoes, and the old mountains, climb the terraced rice fields, each terrace water-filled. In the evening the setting sun reflects off these terraces, and makes hundreds of burnished mirrors out of them.

Borobudur

T. P. Timmerman of General Netherland-Indies Electriciteit Mij (about whose person and company we had something to say last week) was good enough to drive us over toward Semarang so that we could see the Borobudur, which is one of the most famous temples in the world. This monumental edifice is a relic of the days when Java was Buddhistic, and was probably constructed in the eighth century A. D.

After Java went Mohammedan, priests of the latter faith ordered this great reminder of the rival religion completely buried. It lay thus for centuries, with vegetation and trees growing above one of the artistic and architectural treasures of the world.

In 1814 Sir Stamford Raffles, who was then governor of the East Indies (at that time under British rule), heard tales of this buried treasure, discovered the site, and ordered it excavated. The Dutch finished the job of restoration in 1907.

Its design is that of the stupa, the hemispherical type of building which always houses Buddhistic relics or remains. (The cremated ashes of Siddhartha Gautama, the Buddha, were said to have been divided into 84,000 parts, and distributed in special containers to stupas everywhere.)

A complicated polygon of nine terraces, the Borobudur is said to be both a monument to the dead Buddha and a throne for the coming one.

The Borobudur is not, as it might first appear, a structure of solid ma-

sonry. Rather, it is built on the crest of, and around, a small knoll. The six lower terraces are square; the three highest are round. Occupying 394 square feet, the stupa is 115 feet high.

Even more than for its massivity

and magnitude of conception, this temple is notable for the quality and excellence of its sculpture. There are, for instance, 432 niches in the walls, each containing a statue of Buddha.

The main and inner balustrade walls contain 1,300 sculpturings. Those on the first terrace tell the story of Buddha on earth, the second set depict Buddha's previous lives, and on the third tell the legend of the Messianic Buddha. Most of the sculptures are still undeciphered, although they all are of value to scholars and historians, inasmuch as they throw light on the life, customs, manners, and implements of the period.

The top three terraces have 32, 24, and 16 tiny stupas, each of masonry latticework, with a praying Buddha within. Crowning the entire building is a bigger stupa, with an unenterable room containing an unfinished Buddha.

This is beginning to sound dull, so, although we have many more notes on the details of this highly detailed piece of work, we'll leave the rest to snapshots, and get on into Java. Whoops—forgot to mention that Mr. Timmerman also took us to the nearby temple of Mendoet—much smaller, neater, and containing an excellent statue of the bland, sitting Buddha, 18 feet high.

At the Borobudur

Upper left: Back to Buddhism. The Borobudur, near Semarang, a marvel of Javanese architecture, relic of the days when the country was Buddhistic. Right: Street scene in Bandoeng. Lower left: Bicyclists, a motorist, and pedestrians on a street in Soerabaya. Right: T. P. Timmerman of General Netherland-Indies Electriciteit Mij, in the midst of the Borobudur terraces.

GRUNOW SERVES NOTICE!

THE handwriting is up on the wall where everyone with half an eye can take a look at it.

On June 28, in newspapers and rotogravure sections from Coast to Coast, Grunow will announce TELEDIAL, the first real, workable, foolproof device for instantaneous station selection and tuning—15 stations with clear, strong, perfectly tuned signals in 15 seconds—by stop watch. The first radio improvement in years that prospects can see and play with. *Floor play?* It can't miss!

TELEDIAL was coming some day. Now TELEDIAL is here.

Grunow engineering perfected it. And patented it!

Just as SAFETY in electric refrigeration is inevitable. Grunow has shown the way by perfecting the Grunow vacuum circulation system to handle Carrene, the super-safe refrigerant. Grunow perfected it. And patented it!

And Grunow serves notice that before the year is over, Grunow will give the industry another red-hot, sizzling sensation to boost floor play and sales. Don't wait for it—get aboard now. The parade is on. This way to the Big Show!

GENERAL HOUSEHOLD UTILITIES CO.

CHICAGO, ILLINOIS - - - MARION, INDIANA

Manufacturers of Grunow Super-Safe Carrene Refrigerator
Grunow Household Radios • Grunow Automobile Radios

Air Conditioning

80% of Exhibits at Texas Centennial Said To Have Comfort Cooling

(Concluded from Page 1, Column 3)
translate the functioning of the huge central cooling plant to condition the entire building into a size and scope understandable to the layman.

The 300-ton system which actually air conditions the General Motors Building is of flexible design to permit operation of as many 20-ton compressors as may be required by the number of persons in the building and the climatic conditions outside.

It serves a large central auditorium, a motion picture theater in which sound pictures on progress in air conditioning, refrigeration, and automotive and rail transportation are shown, dressing rooms for performers, the Centennial headquarters of the Fort Worth Press Club, exhibit halls for United Motors Service, General Motors research laboratories, Delco products, Inland, Delco Brake, Moraine Products, and the Frigidaire Hall of Science.

Installed by Spitzley

The installation, one of the largest on the grounds, was designed by engineers at Dayton, and installed by R. L. Spitzley Heating Co., Detroit distributor.

In the Hall of Science, which occupies a major section of the building, is an array of research laboratory demonstrations which interpret modern refrigeration so that persons without scientific training may understand them.

The exhibit covers both refrigeration for the home and for food vending establishments. It consists of a progressive demonstration of the major points of food preservation climaxed with a promotional motion picture of a Frigidaire being dropped from a blimp into Biscayne Bay.

In the central part of the hall, medical students manned with microscopes demonstrate the living bacteria in actual food, and explain the hazards to health from improperly preserved foods and beverages.

Household Products Exhibit

The Frigidaire household product display contains representative models from both the super and master lines with setups giving the "proof" story which has been the company's advertising theme this year.

A sensitive vibration indicator registering in ten-thousandths of an inch is attached to the side of a household unit to demonstrate the balanced construction. Company representatives report that the gauge runs smoothly when the unit is in operation, but reacts violently to the touch of a finger on the cabinet.

To prove low operating cost Frig-

dairie is using its lamp-bulb test which shows the current consumption of a light bulb as compared with a household model refrigerator. A large thermo-gauge is used to prove fast-freezing.

The hall was conceived by the household division of the company, and designed and built under the supervision of A. D. Farrell, manager of exhibits and displays. Several duplicate Halls of Science are being taken on the road for showing in the major department and furniture stores and utility showrooms throughout the United States.

One of the features of the building that attracts attention is a "magic fountain" which is operated by a photo-electric eye so that as person stoops to take a drink a spurt of water is ready for him.

Airtamps in Chrysler Building

Airtamp conditioning units are both employed and displayed in the Chrysler Building, where a 125-ton system supplies comfort cooling.

To give the required contemporaries to the Little America exhibit of Admiral Byrd, a 20-ton Airtamp unit was installed. Much of the original equipment used on the expedition can be seen here, including an airplane, the log book, technical instruments, and Eskimo dogs, several of which made the trip.

Continental Oil Co. uses a 20-ton Frigidaire unit to condition its Conoco Hospitality House in which it maintains lounges and a travel bureau.

Eastman Exhibit Cooled

Another Frigidaire installation is found in the Eastman Kodak Exhibit which requires a 15-ton unit. One of the larger units is that of the Dupont exhibit space where approximately 50 tons of refrigeration have been furnished by Frigidaire.

Installations of Carraway conditioning units have been made in the Armour & Co. exhibit, where approximately 30 tons of refrigeration are used, and in the Contemporary Model Home with a total of 11 tons.

Air conditioning was not essential in the model home, the architect explained, because its design is fundamentally one that provides for natural air conditioning. "We realized," he explained, "that no design could satisfactorily offer the proper displacement of used air when as many as 10,000 visitors a day go through the house."

Carraway Installations

Other Carraway installations include the Black Forest Amusement Zone and restaurants, a group of conces-

Air-Conditioning Installations



Above: One of Frigidaire's new 20-ton air-conditioning compressors, with a 20-hp. motor in between the twin 4-cylinder compressors in the engine room of General Motors building at the Texas Centennial, is inspected by six Rangerettes under the guidance of Phil M. Bratten, left, Delco-Frigidaire Conditioning Corp. distributor for Northern Texas, and R. L. Spitzley, Detroit. Below: Westinghouse's 120-ton system in its exhibit space in the Electric and Communications building. Left to right—F. M. Mayse, air-conditioning engineer; R. N. Robar, electrical engineer; and G. H. Lewis, exhibit manager.

sions modeled after a typical German establishment.

In the Ford Building are three Carrier units, one of approximately 400 tons capacity, another of more than 60 tons, and a third of approximately 40 tons capacity.

List of Carrier Jobs

Other Carrier installations include: the Hall of Religion with a 50-ton unit, the art display space of the Museum of Fine Arts which requires a 100-ton machine, and the Missouri Pacific Railway System Exhibit in the Travel and Transportation Building which employs a 50-ton unit.

The Magnolia Petroleum Exhibit in Petroleum Hall uses 20 tons of refrigeration; the Texaco Co., 40 tons; the City of China concession, on the Midway, 40 tons; and Dreyfuss and Son, the only retail clothiers within the grounds, 20 tons.

Completing the list of Carrier installations is the widely publicized Streets of Paris concession where two units are installed, one of 30 tons capacity in the Centennial Club Lounge, another between 7½ and 10 tons in the Game Room of the same establishment.

Westinghouse Cools Neighbors

Westinghouse Electric Co.'s air-conditioning division serves several nearby exhibitors from the 120 ton system installed in its own exhibit space in the Electric and Communications Building.

Westinghouse conditions its own exhibit with a system of concealed overhead ducts. Motors, condensers, and compressors of the air-conditioning units are visible for inspection through a window placed in the machinery room housing the mechanism.

Located outdoors adjacent to the exhibit is a cooling tower of 400 g.p.m. capacity, for the condensing water of the equipment. It requires forced draft cooling by motor operated fans.

Westinghouse refrigerators are displayed in a room by themselves, and another section of the exhibit shows full-sized all-electric kitchens and laundries.

Rural Electrification progress is depicted in the Westinghouse exhibit by miniature models of the modern electrical conveniences for farm household and field service. A kitchen and laundry with all-electric range, refrigerator, dish-washer sink, water heater, washing machine, and ironer are displayed by automatically revolving walls.

American Telephone and Telegraph Co.'s 3,200 sq. ft. of space has a separate Westinghouse unit for conditioning.

Other Westinghouse Systems

Other Westinghouse systems have been installed in the following exhibits: Gulf Refining Co., 25 tons; Morton Milling Co., 30 tons; National Cash Register Co., 15 tons; Owens-Illinois Glass Co., 15 tons; Sears

and 175 ft. deep stage, and a real stream flows before the footlights with replicas of the boats of the first explorers of Texas floating on its waters.

Agriculture and Live Stock Exhibit

Contrasted to Chicago's emphasis on science, Texas makes one of the outstanding features of its exposition the Agrarian Way, along which five large buildings house what is claimed to be the largest agricultural and live stock exhibit ever assembled in one place.

The poultry building with its 7,500 coops of poultry, and the Foods, Agricultural, and Live Stock Buildings make up this group.

In the Food Products Building, a 68 ft. refrigerated case installed at a cost of \$15,000 has attracted considerable attention, Mr. Webb says. It is used to display the various fruits of commercial value in Texas and is so arranged that spectators can see the most approved methods of packing for shipping, read detailed reports on the best cultivation and propagation of any fruit or vegetable and view a complete resume of that particular industry planned so that all salient points are easily and quickly learned.

Cultural Center

Another of the outstanding projects of the Exposition is the Civic or Cultural Center built by the city of Dallas. Here are five museums: Hall of Natural History, Hall of Horticulture, Hall of Domestic Science, Aquarium, and the Hall of Fine Arts; an open-air amphitheater, and symphonic shell compose the \$1,500,000 group of permanent buildings.

A Negro Life Building showing the cultural development of the race is the most exceptional feature of the Federal exhibit. Other structures of the federal unit house exhibits of the 48 states.

The air conditioning in the United States building protects such priceless exhibits as the displays of the Library of Congress, the true replica of the Gutenberg Bible, rare books, and the famed "talking book." In the Federal Building also, the original of the Louisiana Treaty, and valuable papers from the Smithsonian Institute are to be found. Here the printing presses from the Bureau of Printing and Engraving can be seen in operation every day.

Amusement Concessions

Leading industries in the United States complete the composite United States picture, some with displays in the exhibit halls, and others in buildings of their own structure.

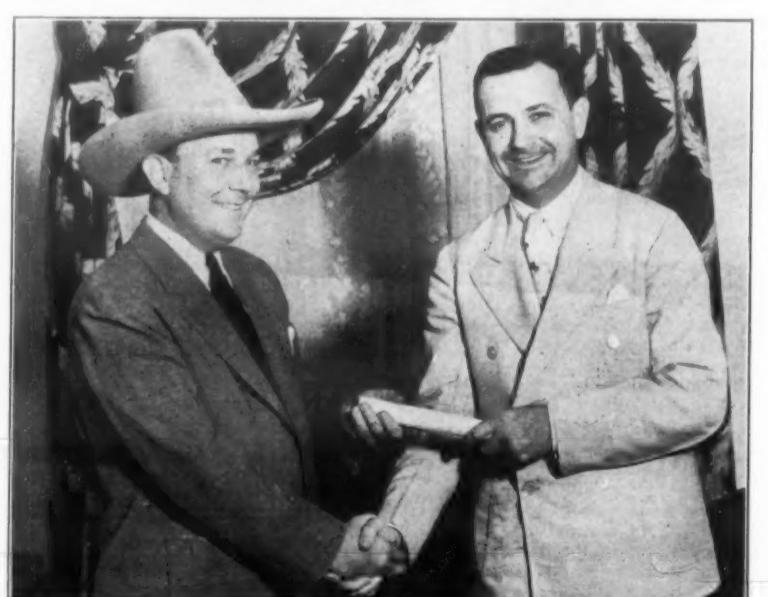
For straight amusement, there's the Midway, with its rocket speedway, Street of All Nations, the Black Forest of Germany, the Pigmy Village, thrill rides, and all types of "shows." Unique among Fair sights, however, is the "Land of Make-Believe," a playground development in which various rides, children's restaurants, shows, and other features are especially designed to appeal to youngsters.

25,000 See Model Chicago Air-Conditioned Home

CHICAGO—More than 25,000 visitors have inspected the air-conditioned demonstration home at 10620 S. Irving Ave. here since it was opened May 6 by the Chicago Evening American.

The house has complete year-round conditioning and an all-electric kitchen which includes an electric refrigerator, range, dishwasher, and waste-dispenser.

Another Texas Ranger



Frank R. Pierce, Frigidaire household sales manager, was made a full-fledged member of the Texas Rangers at the opening of Frigidaire's exhibit at the Texas Centennial in Dallas. Here he is, 10-gallon hat and all, receiving his commission from Gov. James B. Allred.

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FIXED DIFFERENTIAL!**

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Refrigeration Dealers Dominate Indianapolis Air Conditioning Field; Sales Start Slowly

By Phil B. Redeker and T. T. Quinn

News Staff Seeking the Who, What and How of Air-Conditioning Sales

Who (what type of firm) is selling air conditioning?

What methods are being used to sell it to the public?

How are local cooperative groups promoting the idea?

The above are questions of interest to everyone connected with the air-conditioning industry. To get a clue to the answers of these questions, members of the News editorial staff are visiting representative cities to find out who is selling air conditioning, what methods they're using, and how they're promoting the idea collectively.

Reported on this and succeeding pages are the findings for Indianapolis.

From Jan. 1 to June 1 of this year 10 installations of air-conditioning equipment with a comfort cooling phase had been installed in Indianapolis.

Business Is Picking Up

This is a rather unimpressive record for a city of nearly 400,000 population, in an area which often badly needs comfort cooling several months of the year. Under the circumstances one might be led to expect expressions of discouragement on the part of Indianapolis air-conditioning dealers.

Such, however, was not the case. Most dealers we talked to were highly optimistic about their prospects. There seemed to be three general reasons for this enthusiasm:

(1) Business has picked up in June. It is expected that 30 or 40 installations will be completed this month; (2) In addition to this, there are more prospects who have shown a real buying interest; (3) The program being undertaken by the Indianapolis Power & Light Co. should be a real sales builder.

Wide Variety of Users

The 10 installations made up to June 1 of this year illustrate the wide variety in the market for air-conditioning equipment. Two installations were made for dress shops, and one each in a shoe shop, jewelry store, tap room, funeral parlor, private office, restaurant, library, and apartment. The 10 installations totaled 50% tons of refrigeration, with a rating of 71/4 hp.

A tabulation of the installations made previous to 1935 is published on page 10.

Utility Helps with Lower Rates & Promotion Program

Before launching into the story of who the air-conditioning dealers in Indianapolis are and how they're operating, the story should be told of what the Indianapolis Power & Light Co. is doing, for the utility's program is destined to play a large part in the future of air-conditioning selling in Indianapolis.

The power company left no doubt as to its intentions of really pushing the air-conditioning market by offering a promotional rate on both commercial and residential types of service. The rate starts at 2 1/2 cents per kWh, and scales down to as low as 1 1/4 cents per kWh, depending on amount of current consumed. With this rate there is a \$7.50 minimum and a modest demand charge.

Hildreth Directs Program

E. S. Hildreth, power engineer, is in charge of the Power & Light Co. air-conditioning department. Young, aggressive, and well-liked by the dealers, he has inaugurated a promotion program that is sure to make Indianapolis citizenry more air-conditioning conscious.

When we called on him in the Electric building we didn't find him in his office, but finally located him on the 10th floor, assisting in the manual labor of setting up an exhibit of various makes of air conditioners.

All distributors of nationally known makes of air conditioners had been invited to participate in the exhibit. Mr. Hildreth informed us, and he expects to have some seven makes on the floor when the show is finally ready to open.

Public to Attend Exhibit

The public will be invited to inspect the exhibits, which will show the equipment in actual operation.

But this isn't all the power company has done to promote summer air conditioning. A direct mail campaign, sent to a select list of commercial and residential customers, has focused at-

best meet your particular needs—give you facts about actual costs and results in well-known local houses.

"We neither sell nor install air-conditioning equipment, and therefore are interested only in seeing that you get the best service. It will cost you nothing to talk it over with us."

Dealers Form Council

Mr. Hildreth was also instrumental in getting the local dealers to form an Air Conditioning Council as a division of the Electric League of Indianapolis. The constitution adopted by the Council defines its purposes as follows:

"The purposes for which this Council is formed are: the fostering of trade and commerce among air conditioning contractors; to reform abuses and secure freedom from unlawful and unjust exactions; to disseminate accurate and reliable information as to the address and standing of manufacturers, contractors, merchants and of other matters by monthly or weekly bulletins or otherwise; to procure uniformity and definite practice in customs and usages of this branch of business; to settle differences between its members; to promote a more universal and friendly intercourse between men in this line of business, and to secure mutual protection, con-

servation, and advancement of air conditioning and all its branches."

Get Business Bureau's Help

One of the major accomplishments of the Council was in getting the Indianapolis Better Business Bureau to send out a bulletin asking cooperation from manufacturers and merchandisers of various products in the observance of the standard definition "air conditioning" prescribed by the Council.

"This was in the nature of a 'preventive' measure designed to restrain anyone who might attempt to cash in on the popularity of the term 'air conditioning' without really having a product that would perform any real air-conditioning function," Mr. Hildreth told us. "So far," he stated, "we have found nothing on this score to complain about, so the bulletin must have been effective."

One of the next moves of the Council will be an effort to adopt minimum standards and requirements on air-conditioning jobs where the minimum requirements can be estimated, said Mr. Hildreth.

Following is the personnel of various committees of the Council: Standardization—I. G. Kahn (chairman), Hatfield Electric Co. (Carrier); Harry Hall, Electric Appliances, Inc. (G-E);

B. C. Simon, Minneapolis-Honeywell Co.; Warren C. Bevington, Bevington-Williams, Inc. (consulting engineers); Emmett G. Fowler, J. M. Rots Engineering Co. (consulting engineers).

Educational and Trade Relations—

S. O. Steves (chairman), Meier Electric & Machine Co. (Kelvinator); Fred C. Barton, Hayes Bros., Inc. (Frigidaire); G. B. Supple, American Blower Co.

Membership and Rules: R. S. Hays (chairman), Refrigerating Equipment Corp. (Frigidaire); P. C. Lewis, Westerlin and Campbell Co. (York); Mr. Hildreth.

Investment Business Background Valuable to Carrier Dealer

Air conditioning is the best investment any commercial establishment can make. If you doubt that statement, ask I. G. Kahn, who used to be in the investment business.

Mr. Kahn is manager of the sales department of Hatfield Electric Co., Carrier distributor in Indianapolis. He is, in fact, the whole sales department, handling all the company's air-conditioning business within a 75-mile radius of the city.

An interesting example of the draw which air conditioning has for men in widely varying fields, Mr. Kahn (Continued on Page 10, Column 5)

FIRST on the AIR LINER FIELD

LIPMAN
AIR CONDITIONING

PORTABLE UNITS FOR COOLING AND HEATING

Because LIPMAN pioneered air conditioning in the railroad and truck fields it was only natural that the air transport lines should turn to LIPMAN for their air conditioning equipment. While in flight, the temperature in a transport plane cabin is kept comfortable by the engine and ventilating system. But when the plane is grounded under a blazing summer sun or in a frigid winter gale, the cabin quickly becomes unbearably hot or cold. To overcome this problem, LIPMAN has developed a portable airplane air conditioning unit which supplies plenty of clean, comfortable air, of the desired temperature to place the cabin in perfect condition for boarding passengers. Mounted on a truck chassis, the LIPMAN Airplane Air Conditioning Unit can be driven quickly from plane to plane and has sufficient capacity to service several planes in the few minutes they may be in port at a busy terminal. Similar LIPMAN equipment is being designed for principal air lines. If you want to handle a line that gives you every modern advantage write for information covering the LIPMAN line and distribution plan.

GENERAL REFRIGERATION SALES COMPANY

Dept. AF-16, Beloit, Wisconsin, U. S. A.

Where Air-Conditioning Systems Have Been Installed in Indianapolis Up to April 15, 1936, Who Installed Them and What Companies Made Equipment

Name and Address	Equipment & Installed By:	Fan, Pump & Refrig.	Tonnage	H.P.
Banks (1) Indiana National Bank, Pennsylvania St. & Virginia	Amer. Blower Co.	0	45 1/2	
Beauty Shops (1) Van Hunter Permanent Waving System, Inc., 415 Roosevelt Bldg.	Frigidaire	5	5 1/4	
Churches (1) Fifth Church of Christ Scientist, College & 62nd St.	E. K. Campbell	0	15	
Clubs (1) Columbia Club, Cascade Room, 121 Monument Circle	Frick—Hayes Bros.	10	11 1/2	
Doctors & Dentists (1) Hanning Bros., Dentists, 204 Kresege Bldg.	York—West. & Campbell	3	4	
Hospitals (1) Ft. Benj. Harrison (Operating Room), Ft. Harrison	Frigidaire	3	3 1/2	
Hotels (1) Claypool (Riley Room, Grill, Cafe, and Chateau), 14 N. Illinois St.	Amer. Carbonic	35	65	
Industrial Applications (5)	(Steam Powered Compressor Unit)	80	10	
Candy (1) Dilling & Co., Chocolate Ave. & Morris St.	Carrier	250	400	
Miscellaneous (8) Eli Lilly & Co., 740 S. Alabama St. Bixby Shoe Polish Co., W. Morris St.	Frigidaire	5	5 1/2	
		256	405 1/2	
Dairy (2) Banquet Ice Cream & Milk Co., 1214 Southeastern	York—West. & Campbell	10	17	
Ballard Ice Cream Co., 315 N. Alabama St.	York—West. & Campbell	8	8	
		18	25	

General Offices & Buildings (3)

Eli Lilly & Co., 740 S. Alabama St.	Carrier	7 1/2	7 1/2
*Refrigerating Equip. Corp., 931 N. Meridian St.	Frigidaire	10	10 1/2
Thos. L. Green Mfg. Co., 202 Miley Ave.	York—West. & Campbell	7	12
		24 1/2	30

Private Offices (8)

Capitol Paper Co., 223 W. South St.	Kelvinator	2	2
Associated Theater Owners of Indiana, 444 N. Illinois St.	Frigidaire	1	1
United Mutual Life Ins. Co., 941 N. Meridian St.	Gar Wood	2	2 1/2
*Barbasol Co., 814 N. Senate Ave.	General Electric	1 1/2	1 1/2
J.W. Holliday & Co., 545 W. McCarty St.	York	1	1
Acker Air Conditioning Co., 516 Circle Tower	Ackeraire	1/2	1/2
Hume-Mansur Bldg. Co., 23 E. Ohio St.	Carrier	1	1
Schwitzer-Cummins Co., 1125 Massachusetts Ave.	Servel	1 1/2	1 1/2
		10 1/2	11

Residences (21)

C. S. Wheeler, 4510 N. Meridian St.	Frigidaire	4	4 1/2
Geo. A. Bangs, 2625 N. Meridian St.	Frigidaire	3 1/2	3 1/2
J. H. Lacey, 43rd St. & Kessler Blvd.	Gar Wood	2	3
J. H. Lacey, Jr., W. 79th St.	Gar Wood	0	4
Austin H. Brown, 4401 N. Illinois	General Electric	1/2	1 1/2
Eli Lilly, 5807 Sunset Lane.	Frigidaire	3	3 1/2
J. K. Lilly, 65th & Eagle Creek	Frigidaire & G-E	2	2 1/2



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Your ability to serve customers depends upon the effectiveness of your service facilities. Hence, you realize, when selecting motors, that it is very important to give consideration to the service the motor manufacturer can give.

Wagner maintains 25 branch offices, warehouses and service stations in all parts of the country. Each service station carries a complete stock of motor-parts, available for immediate shipment. Thus Wagner assures immediate attention to your needs of Wagner customers, whether they be in Maine or Oregon, in Minnesota or Texas. When there's trouble with any make of motor, or any information wanted on motors, get in touch with Wagner's nearest branch.

MS136-1M

Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, U.S.A.

Motors

Transformers

Fans

Brakes

Name and Address	Equipment & Installed By:	Fan, Pump & Refrig.	Tonnage	H.P.
G. A. Efroymsen, 2625 N. Meridian St.	Frigidaire	3	3	
Richard Fairbanks, 5850 Sunset Lane	Frigidaire	1 1/2	1 1/2	
Wm. Coleman, 1006 N. Meridian St.	General Electric	1 1/2	1 1/2	
Meyer Efroymsen, 3627 N. Pennsylvania St.	General Electric	1 1/2	1 1/2	
Alvin R. Jones, 231 Hampton Dr.	General Electric	5	5	
Mrs. L. Lovell, 2902 N. Meridian St.	General Electric	3	3	
Myron McKee, 4320 Cold Springs Rd.	General Electric	5	5	
J. Yunker, 5223 N. Meridian St.	York	1	1	
Otto N. Frenzel, Jr., 5008 N. Meridian St.	York	1	1	
Norman R. Kevers, 5715 N. Pennsylvania St.	Sturtevant & Aerofin	0	2	
Chas. H. Cassell, 28 S. Audubon Rd.	Larkin	0	1 1/4	
Jos. J. Cole, 4909 N. Meridian St.	Carrier	2	2 1/4	
Harry Hartley, 4051 Washington Blvd.		36	46 1/2	

Restaurants & Bars (18)

Name and Address	Equipment & Installed By:	Fan, Pump & Refrig.	Tonnage	H.P.
Antlers Hotel, Mirror Rm., 750 N. Meridian St.	Frigidaire	3	3 1/4	
Charley's, 144 E. Ohio	Frigidaire	18	20	
Craig's, 6 E. Washington St.	General Electric	10	12 1/2	
Eaton's, 642 E. Maple Rd.	Carrier	30	31 1/4	
Fendrick's Peasant Room and Restaurant, 114-118 N. Illinois St.	Carrier	2	2	
Marott Hotel Tap Room, 2625 N. Meridian St.	Carrier	25	13	
Wheeler's, 8 W. Market St.	Carrier	30	9 1/4	
Wheeler's, 138 N. Pennsylvania St.	Carrier	15	16 1/2	
Thompson's, 42 W. Washington St.	Carrier	10	8 3/4	
Thompson's, 40 E. Washington St.	Frigidaire	6	6 1/2	
Seville Tavern, 7 N. Meridian St.	General Electric	7 1/2	7 1/2	
Harrison Hotel Dining Rm., 51 N. Capitol	Carrier	25	42	
Severin Hotel Rathsakler, 201 S. Illinois	Carrier	13	14	
Sandy's, 2206 N. Meridian St.	Carrier	0	25	
Tice's Tavern, 35 E. Maryland St.	Carrier	1136 1/2	1668 1/2	
Lincoln Hotel Restaurant, 117 W. Washington St.	Carrier	25	34	
Circle Tavern, 37 Monument Circle	Carrier	8	10	

Stores, Clothing, Dept. (7)

Name and Address	Equipment & Installed By:	Fan, Pump & Refrig.	Tonnage	H.P.
L. S. Ayres & Co., 1 W. Washington St.	Carrier	250	325	
L. S. Ayres & Co., 1 W. Washington St.	Carrier	200	278	
L. S. Ayres & Co., 1 W. Washington St.	Carrier	0	27	
Wm. H. Block, Co., 50 N. Illinois St.	Carrier	420	687	
Sally Frocks Shop, 34 W. Washington St.	Carrier	12	12	
H. P. Wasson & Co., 16 W. Washington	Carrier	240	299	
Morrison's, 20 W. Washington St.	Frigidaire	13	14	
Griffith Shop, 30 Monument Circle	Carrier	0	25	
Kresge's 5 & 10 Cent Store, 23 W. Washington St.	Liberty	1136 1/2	1668 1/2	

Stores, Fur (1)

Name and Address	Equipment & Installed By:	Fan, Pump & Refrig.	Tonnage	H.P.
Indiana Fur Co., 29 E. Ohio St.	Frigidaire	4 1/2	4 1/2	

Stores, Jewelry (2)

Name and Address	Equipment & Installed By:	Fan, Pump & Refrig.	Tonnage	H.P.
Edw. F. Petri, 206 Guaranty Bldg.	General Electric	3	3	
Rogers & Co., 5 N. Illinois St.	Carrier	11	10 1/2	

Studios (1)

Name and Address	Equipment & Installed By:</

Air Conditioning for Homes Is Ranked in Luxury Class by Indianapolis Dealers

(Continued from Page 10, Column 5)

"This is still more or less of a plaything to us," Mr. Kahn said, pointing to a Carrier self-contained room cooler displayed at one corner of the floor. Several others, still crated, were across the room.

"They're still rather hard to get. We ordered 10 of them—six of those over there are sold already. But, as I said, these are just playthings as far as we're concerned. We'd rather go after the bigger jobs."

Range of the company's installations to the present, Mr. Kahn said, has been between 7½ and 100 tons. The field of activity has been pretty general, commercially—and while last year was good, the interest evidenced this year indicates that, from the standpoint of numbers, the 1935 mark will be left far in the rear by 1936 sales.

Homeowners Have Other Wants

"Home air conditioning is still definitely in the luxury stage," Mr. Kahn believes. "People are interested in it, but there are other things they'd rather have; a new car, for instance—or clothes."

"That's one reason why we are interested in the commercial market rather than the home, at present. We can sell air conditioning to the merchant as an investment; we have to sell to the homeowner as a luxury."

"Commercial establishments see the value of the equipment, install it, and pay for it. A home owner, on the other hand, is apt to install a room cooler as an experiment, operate it during the hot weather, and let it go back to us in the fall."

"Yes, air conditioning for the home is still very much in the luxury class."

Some Hatfield Installations

To prove that Hatfield really has been active in air conditioning, Mr. Kahn reeled off a partial list of the jobs the company has done:

Rink's ladies' specialty shop; Sally Frock Shop; Thomson McKinnon Brokerage Co.; Severin Hotel rathskeller; Thom McAn shoe store; Eli Lilly Co. (biological laboratory); the dining room of Homelawn Sanitarium, Martinsville, Ind.; Goodman's department store, Shelbyville, Ind.; Miller-Wohl, Lafayette, Ind.; H. P. Wasson & Co., Wm. H. Block, and L. S. Ayers department stores, Indianapolis; Wheeler's (2), Thompson (2), and Fendrick's restaurants; Seville Cafeteria; Rogers jewelry store; private

offices in J. H. Aufderhuide Investment Co.; the Eli Lilly residence, and the bedroom of the Eugene Darrah home.

Industrial Jobs Completed

Industrial jobs done by the company include Real silk Hosiery Mills, Acme-Evans Flour Mills, National Silk Hosiery Mills, and Pittman-Moore Chemical Co.

Having a large number of installations gives the company a big jump in dealing with prospects, too, Mr. Kahn believes.

"Whatever business the prospect is in," he says, "there's one of our installations, in operation, which is meeting the same conditions that he wants. Our range of installations covers a broad enough field that we can practically show him a working job, tailor-made to his desire."

Market Outside of Indianapolis

An encouraging feature of the company's air conditioning progress, Mr. Kahn said, is the inroads which have been made in the cities surrounding Indianapolis—cities like Muncie, Shelbyville, Martinsville, and Lafayette.

"The smaller towns are following the leader," in his opinion. "They are almost forced to, to protect their trade."

"It didn't use to be so, but merchants in the smaller towns realize now that people will travel 25 or 30 miles, in summer, to visit stores where they can shop in comfort."

Study Large Town Merchants

"Once customers get into the habit of going to the metropolis to trade, the merchants in the smaller cities have lost them. The merchants know this—and so many of them have taken steps to keep up with their Indianapolis cousins, by installing comfort cooling."

"And, as shoppers become more 'air-conditioning minded', more and more installations will be made in these smaller towns, by merchants who want to keep their home-town customers from getting out of the habit of trading with them."

One-Man Sales Staff

Asked how it happened that he handled the whole selling job himself, Mr. Kahn said that what had held him back more than anything else in hiring men was the training work

necessary before they were able to get out in the field themselves.

"I could use a couple of salesmen, some of the time," he said, "because the territory here is really too much for one man, but I can't get experienced men, and I don't have enough time to spend training any others."

In his opinion, there isn't a great difference from what business you come into air conditioning, as long as you know how to sell. In his own case, he brought to air conditioning a wide circle of acquaintances, made during 25 years in the investment field—men to whom he had gone several times with investment opportunities.

Now he's going to them again, but this time with another investment—air conditioning.

Plan 'Model Office' Job

As a promotional venture, Hatfield Electric is planning to air condition a "model office" in one of the suites in the Circle Tower Building in downtown Indianapolis.

It is a cooperative scheme, designed to give business executives a picture of the office of the future, Mr. Kahn says. One of the city's prominent interior decorators will decorate it in modern style, another firm will equip it with floor coverings and drapes, and another will put into it the latest office furniture.

Hatfield will supply the air-conditioning equipment as its part of the venture. The model office will be open to inspection at all times during daytime hours, and an attendant will point out its features to visitors.

Mr. Kahn believes the display will do a great deal toward increasing the use of air conditioning in the private offices of executives and business men throughout the city. And after they see how much it increases their own efficiency, smart business men, he thinks, will not be long in making it available to their whole organizations.

Wheeler Says Homeowners Are Not Ready to Buy

Present status of residential air conditioning in Indianapolis, in the opinion of Clark Wheeler, manager of Refrigeration Equipment Corp., Frigidaire distributor, may be summed up in words similar to Mark Twain's famous comment concerning New England weather: Everybody's talking about air conditioning, but nobody seems to do anything about it.

"Air conditioning in business places has shown considerable activity in and around Indianapolis," said Mr. Wheeler. "Air conditioning in homes, however, hasn't made anything more than a start."

"It isn't a matter of not being able to afford it, either," he continued. "There are plenty of people in this city who have very comfortable incomes—who are well able to afford air conditioning in their homes, if they want it."

Not in Buying Mood

"Price means nothing to them in other things. They buy the highest-priced cars, their clothing is of the best quality, their homes are wonderfully furnished."

"They are interested in air conditioning, too. They want to know about it, think it has 'a wonderful future.' Some of them are even interested enough to have estimates made on the cost of an installation in their homes."

"But when the price is mentioned, they throw up their hands. 'It's too high,' they say. Which is just another way of saying, after all, that they don't want air conditioning—yet. For if you are really interested in something, and want it enough, the price is unimportant."

Cost of Ductwork Is Barrier

It might be assumed from the foregoing that Mr. Wheeler is pessimistic about the future of residential conditioning in the city. Not at all—he thinks it will go great guns, some day. His point is simply that, as yet, home conditioning just hasn't caught on in Indianapolis.

One drawback to residential conditioning, Mr. Wheeler thinks—and this applies to entire residences and year-round systems, primarily—is the added expense of ductwork where the heating system is hot water or steam. He installed a system in parts of his own home last year. His home is heated by hot water, so he knows about the problem from first-hand experience.

Heating Replacement Will Help

As present heating systems become obsolete or in need of replacement, he thinks, sale of air conditioning in homes will rise to something near the figure it should. When that time comes, the business will go to the companies with year-round facilities—and he feels that his company, with Delco-Frigidaire, will be in a good position.

Most of the business done in air conditioning in Indianapolis has been in the places where it was felt that more money could be made through using it," Mr. Wheeler said. "That includes some of the department stores, dress shops, restaurants, taverns, hotel dining rooms—places of that sort. Comfort-cooling installations haven't kept pace."

"Of course, few people expected that they would. Air conditioning for

homes is still pretty much in the 'luxury' class, and it's going to take time to get people to see it as a necessary part of their everyday life."

Fallen Short Commercially

While commercial air conditioning has made notable strides forward, it likewise has fallen a bit short of expectations in some cases, Mr. Wheeler said. This is true of the smaller cities surrounding Indianapolis more than of the metropolis itself.

"There have been cases where a number of installations have been made in one or more of the surrounding cities, in the commercial class, and it looked like air conditioning was getting a real hold there. But there has been a lack of follow-through, it seems. So far, conditioning in these places has been a series of spurts, with periods of comparative quiet between them."

Indications are that installations in both commercial and residential conditioning will show sizable increases for the year, Mr. Wheeler said. "Of course, he added, "no matter how large they are we won't think they're large enough. Perhaps we're expecting the field to come along too fast, but we're rather impatient with sales in the residential class. It looks like the biggest developments there, however, will have to wait until homeowners are educated to the real value and necessity of it."

Then there won't be any more talk about price. For when people are convinced that they want something, what they have to pay to get it is of secondary importance."

Commercial Refrigeration

Commercial refrigeration sales, Mr. Wheeler said, are getting down now into the second-grade market, where credit is considerable of a problem.

"Early sales in commercial refrigeration were all gilt-edged," he added. "There was never any doubt about their being good. Now, though, the installations are getting down into the second-grade stores. Of course, this business is just as good as any other, but it does necessitate a closer check on credits, to see that a customer doesn't get in over his head, in a financial way."

Commercial business has been picking up, and activity is general pretty well down the line, Mr. Wheeler said. Meat markets, grocery stores, restaurants, dairies, taverns—the business appears to be pretty much divided between them, with no particular line standing out over the others.

Beer cooling business, said Mr. Wheeler, has been suffering from the same thing as general commercial—(Concluded on Page 12, Column 1)

RATINGS OF YORK FREON-12

CONDENSING UNITS

are certified to the Refrigerating Machinery Association and the National Electrical Manufacturers' Association under American Society of Refrigerating Engineers' standards.
YORK ICE MACHINERY CORPORATION, YORK, PENNA.

YORK

Headquarters for Mechanical Cooling

York Dealer Claims Price Holds Home Conditioning Back

(Concluded from Page 11, Column 5) credit risks now where none formerly existed.

Of course, there was a definite credit risk when beer first came back. But not for us, because we were careful to take only that type of business which we were reasonably sure would be in the field to stay.

Law Halts Beer Cooler Sales

"Beer cooling, as a field, has been cut down considerably by state law, which prohibits the sale of beer and other liquors outside the city limits.

"This has doomed many of the fine roadhouses which used to operate just outside cities like Indianapolis. When the weather is good, lots of people like to drive out into the country for their dinner and an evening's entertainment. Taking the beer and liquor franchises from these places killed them right off—people have to stay in town for that sort of thing now."

"It put all but a few roadhouses out of business in a hurry. Some of the others moved into town and set up places, but for the most part they passed right out of the picture."

Price Is Barrier to Home Conditioning—Griffith

Interest in home air conditioning has shown a notable increase in Indianapolis this year, in the opinion of W. C. Griffith, president of Griffith Distributing Corp.—but sales haven't. The company handles Grunow household refrigeration and York portable room coolers.

"Every week, we get several telephone calls for information on our room coolers," Mr. Griffith said. "People apparently are interested in air conditioning this year much more than they were last. They want to know all they can about it, and what it will do for them."

Balk at Price of Unit

"Buying, however, hasn't been anything to speak of. We've sold a half dozen or so of the room coolers—not anything near like what we'd like to do."

Price is still the biggest factor in sales, Mr. Griffith said. York's unit retails for about \$495, and, as Mr. Griffith says, "when people have \$500 to spend, they'd rather put it into an automobile or something like that."

The company has been retailing the unit coolers, which are package merchandise, through its regular domestic refrigeration sales force of five men. Little of the selling work has been of the "cold turkey" type, the company relying for most of its leads on phone calls received at headquarters.

Fail to Appreciate Job

What makes people balk when the price of air conditioning is mentioned, believes Mr. Griffith, is that they fail to appreciate the job it does. They are interested in knowing as much about it as possible, but they can't understand how one piece of equipment can be worth that much money.

The company has found it effective, when price is mentioned, to have its salesmen compare unit coolers with household refrigerators, in the jobs they do. Working from the known to the unknown, so to speak.

The salesmen compare the work



The giant new flagship of American Airlines, Inc., largest land plane in the United States, is cooled, before flight, by the new Lipman airplane conditioning unit, manufactured by General Refrigeration Sales Co., Beloit, Wis. Stewardess Laura Nash and Station Manager George Brieschke look on.

done by a household refrigerator, in cooling, say, 6 cu. ft. of space, to that done by a room cooler in cooling the entire room.

"Here," they say, "is a unit which cools 10 or 15 times the space that your refrigerator does—yet its cost is only three or four times as much."

Working from that tack, salesmen report they are able to meet the price and initial cost argument much more effectively than before, Mr. Griffith reports.

Westinghouse Lining Dealers Up to Push Conditioning

Walker Electric Co. in Indianapolis is a branch of a large electrical supply house which has its headquarters in Terre Haute. Chief interests of the Indianapolis branch are its refrigeration parts supply business, and the distribution of Westinghouse commercial refrigeration and air-conditioning products.

Norman Wothers, in charge of the Westinghouse operations, was out of town the day we called, but from his daughter, who works in the office, and John Green, a salesman, we were able to get some information on the company's program.

Selling Dealers on Market
Mr. Wothers is spending much of his time trying to get dealers in his territory interested in going after air-conditioning business. This is not to say that prospects in Indianapolis proper are neglected, in fact, Walker Electric was completing a 10-ton installation in Hillman's, a ladies apparel shop, while we were there.

But Mr. Wothers has a strong and active commercial refrigeration dealer set-up in his territory, which includes such good-sized towns as Terre Haute, Muncie, and Anderson, and he believes there is a real field for air-conditioning selling in these towns (and with less competition).

Display 'Mobilair' Units
A number of dealers have warmed up to the idea of putting a Westinghouse "Mobilair" unit on the floor, to

sell as packaged merchandise like other appliances they handle. For larger installations, the dealers for the present time would act as prospect-getters, and would perhaps make a survey of the requirements, but probably the "closing" of the sale and the engineering and installation work would be done by the distributor.

Mr. Wothers, we were told, is an enthusiastic News reader, so we doubly regret missing him.

Commercial Salesman Best Fitted, Stevens Believes

Meier Electric & Machine Co., Kelvinator distributor for commercial refrigeration and air-conditioning equipment, manufactures exhaust and ventilating fans, and also does electrical and mechanical engineering work.

This firm took on the Kelvinator franchise on commercial and air-conditioning units, placed at principal airports, are being used to pre-cool United Air Lines planes on the New York City-Chicago-California airlines this summer.

Installations Completed
Mr. Stevens has completed a couple of fair-sized installations—one for a tap room, and another for a funeral parlor, and was optimistic about several other prospects.

Mr. Stevens thinks he will make good progress in air conditioning, because of his sales personnel, which has been doing a great job on commercial refrigeration.

Type of Salesman Needed
It's the commercial refrigeration salesman, Mr. Stevens thinks, who is going to sell air conditioning, because of his background in a very similar type of selling, and because of his training in estimating the amount of equipment necessary for various types of applications.

Pointing to the experience and training of his leading salesmen, Mr. Stevens says that those attributes are the most important in selling air

conditioning and commercial refrigeration equipment today. One crack salesman was a service manager for a distributorship before getting into sales work, while another had several years' experience in commercial refrigeration selling in Florida before coming to Indianapolis.

Mr. Stevens is also making efforts to get dealers in his territory interested in seeking out prospects for air conditioning; they would not handle sales and installation work, but would be merely "bird dogs" ferreting out prospects.

Mobile Conditioners Also Used to Cool United Air Liners

CHICAGO—Special mobile air-conditioning units, placed at principal airports, are being used to pre-cool United Air Lines planes on the New York City-Chicago-California airlines this summer.

The conditioners deliver fresh, filtered, cooled, and dehumidified air into the cabins of United's three-miles-a-minute transports, prior to their departure on scheduled flights. Despite high ground temperatures, tests show the insulated cabins of the liners retain the cool air while the plane is ascending from the airport to the cooler regions high above the ground.

A new ventilating system has been installed on the liners, to provide natural "air conditioning" aloft, where summer temperatures are normally from 20° to 50° cooler than on the ground.

Eight feet long and mounted on an automotive type chassis with standard auto tread, the conditioners have a maximum capacity up to 12 tons refrigeration per hour. Each unit is capable of delivering 1,200 c.f.m. of filtered, cooled, and dehumidified air, reducing temperature of the conditioned air, when necessary, from 100° F. to 30° F., and condensing and extracting as much as 1.4 pints of water per minute from the conditioned air.

Calcium chloride brine, pre-cooled to -35° to -40° F., is used as the cooling medium. The pre-cooled air is introduced into the plane through an insulated metal hose, connected with a special duct in the side of the plane's cabin.

Cooling coils, pressure blowers, pumps, controls, and chassis were designed by Caldwell & Associates, Kansas City. Weight of the air conditioner, empty, is 2,700 lbs.; when charged with the refrigerant, it weighs 5,200 lbs.

Used now for cooling, the unit will also be utilized for heating the planes during the winter operations. The medium will be heated by a steam or electric coil to 210° F., and the conditioner will then supply heated and filtered air to heat the cabinets to 80° F., when the outside temperature is -20° F. The planes are equipped with heating systems, to provide comfortable temperatures aloft during winter weather.

B & O to Condition 50 Cars With York Systems

YORK, Pa.—York Ice Machinery Corp. has just received an order from the Baltimore & Ohio Railroad Co. for 50 railroad car air-conditioning systems to be placed in operation this summer. Forty systems will be for coaches, and 10 for combination coach and baggage cars.

Conditioning Unit On Truck Used to Cool Plane Cabins

(Concluded from Page 1, Column 3) electrical resistance for heating the tank contents for winter heating service, and icing coils for summer cooling service.

Liquid in the tank be either water or some lower temperature freezing solution, depending upon the application's demands. Liquid is circulated through a unit heat exchanger, over which the filtered air passes to be either cooled or heated.

A high pressure blower fan delivers the conditioned air through a flexible tube directly to the plane body, or to the inlet of the plane's ventilating system. A damper regulates the quantity of air delivered through the heat exchanger; if desired, the damper can be motor-operated from a portable thermostat, located in the plane.

A high pressure blower fan delivers the conditioned air through a flexible tube directly to the plane body, or to the inlet of the plane's ventilating system. A damper regulates the quantity of air delivered through the heat exchanger; if desired, the damper can be motor-operated from a portable thermostat, located in the plane.

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A self-priming, vertical, direct-motor drive circulating pump supplies the heat exchanger with liquid from the holdover tank. A special high static pressure blower is provided, driven by a direct-connected high-speed motor. Two air filters are accessible through removable screened panels located in the front end of the unit body.

All mechanical equipment and motors are mounted above the tank, and are enclosed in a housing, making a complete assembly similar to a truck body.

Air for the condenser enters at one side of the body and is discharged on the other side. These air opening screens are removable to permit easy access to the mechanical equipment.

Electrical Connections

A 25-ft. length of four-wire cable is provided for supplying three-phase current to the refrigerating machine motor, the extra wire being for a ground connection. The cable is attached to outlets provided in the hangar or on the field. A 50-ft. length of three-wire cable, for supplying current to the circulating pump and blower motors, is also provided.

If necessary, direct-current motors and a storage battery may be provided for operation of the circulating pump and blower where suitable field connections are not available.

Standard 1½ in. railway couplers are provided on the outlets of the steam coil when steam heating is specified; connecting steam hose and return, however, are not provided. Outlets for tank overflow, tank drain, and condensate drain are provided under the unit.

A 20-ft. length of 5-in. flexible hose is provided for air delivery from the air conditioner to the plane inlet. Supporting ledges, to support the hose when in use, are on either side.

Complete equipment is mounted on channels suitable for installation on a 3-ton truck chassis. The unit is furnished with a flat coat of paint, permitting the purchaser to finish it in his own color and insignia.

For summer cooling, water is used in the tank. Where steam heating is required for winter service, an anti-freezing solution, such as Prestone, is advised for protection against freezing.

\$15,000 Job Opens Denver Air-Conditioning Drive

DENVER—A \$15,000 contract was the initial attainment in the air-conditioning sale drive being conducted by the B. K. Sweeney Co., G-E distributor here. The installation is for the new wing which is to be added to St. Joseph's hospital in this city.

Prior to opening the sales drive, the firm added three new men to its staff. John Berger, air-conditioning specialist, is in charge of the company's air-conditioning sales division. Prospecting is done by regular salesmen who also sell refrigerators and other appliances. Berger and two other men plan installation specifications and figure costs on prospective sales.

Installation of equipment for the new hospital wing will be sub-contracted to a local firm.

"AN OLD NAME IN A YOUNG INDUSTRY"

CURTIS

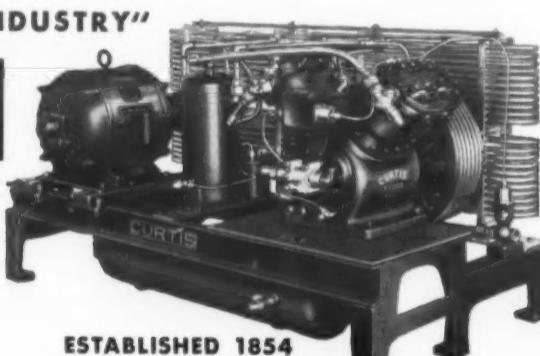
A Complete Line—86 Units

Fair Policy—82 Years' Successful Merchandising

Quality Workmanship—42 Years' Building Compressors

Financial Stability—A. A. A. Highest Capital & Credit Rating

Proven Design—14 Years' Building Refrigeration Units



Only by Building Permanently on This Complete Combination Can You Secure Sure Profits in This Fast Growing Industry—

Curtis is a well integrated institution, having its own gray iron foundry, brass foundry, machine shop, pattern shop, tool room, electric welding department, structural shop and power plant.

CURTIS REFRIGERATING MACHINE CO.

Division of Curtis Manufacturing Co.
1912 KIENLEN AVENUE • ST. LOUIS, MISSOURI

In Canada:
CANADIAN CURTIS REFRIGERATION CO., LTD.
20 George St., Hamilton, Ont., Can.



Air View of Curtis 20 Acres Plant

Utility Sales Engineer Believes That Home Air-Conditioning Will Be Priced As Low as \$100

By T. T. Quinn

ST. LOUIS—George Green, sales engineer with Union Electric Light & Power Co., believes that the real strides in residential air conditioning will be made when manufacturers introduce room coolers which can be retailed for somewhere around \$100.

"The biggest single drawback to home air conditioning right now," he said, "is its cost. The public isn't convinced—at least the St. Louis public isn't—that air conditioning, especially unit room coolers, is worth what they have to pay for it."

The price of a unit air conditioner is right around \$300—some manufacturers are running a little above that, some slightly below. But it's a good average figure. The people have made up their minds that they will some day be able to get this equipment for around \$100.

"That's the price they've made up their minds to pay—and I believe they'll be able to get it for that."

Perhaps that makes you smile. We did—and Mr. Green was quick to call our attention to the fact that he wasn't joking.

"I mean it," he continued.

Cites Radio Industry History

"I realize it sounds a bit fantastic just now—but the public has a habit of getting what it wants, at the price it will pay."

"A few years ago I didn't think it was possible, either. It was in the radio field—and people began saying they wanted a set at lower cost, with all the equipment in a cabinet, attractively finished. I never thought they'd be able to build a set without batteries, all-electric—but that's about all that's on the market today, for city homes at least."

"So when people who come in here say they'd buy a unit conditioner if the price were around \$100, I don't smile—I believe them. They've made up their minds that that's all they'll pay—and the manufacturers will sooner or later meet the demands."

"Then unit air conditioners will really go places."

Price Is Big Barrier

"Right now the big barrier is price—although companies in the city have done a good job, proportionately. Of course the big field is still ahead."

"Potentially, the best market is the home; theoretically, the commercial market is rather easily saturated. Neither of the two is anyway near the saturation point now. When one merchant puts in air conditioning, however, most of his competitors will be almost forced to follow his lead—and this will reduce the commercial field more rapidly than the residential field."

"There, however, the matter of price enters. The homeowners in this city have stated their choice, in the matter of cost—and I'll bet they get just about what they want."

"I haven't the least idea of what the air-conditioning unit they'll eventually buy in great numbers will look like—nobody else has, I guess, either."

Possibilities of Absorption System

"But one practical way of doing the job, to my way of thinking, at least, would be an absorption unit, such as is used in some refrigerators at present—with the flame replaced by an electrical element. This would be economical, at least."

"You never can tell just how a thing like that will work out—but that's one idea that might work, anyway."

The utility's main job in air conditioning right now, Mr. Green said, is to establish the public's confidence in it as a worthwhile investment for health and comfort.

A good deal of the company's work at present, he added, is of the "cold turkey" variety—selling the idea of air conditioning more than the actual equipment. The utility itself does no merchandising. Leads developed in this manner are turned over to the various companies, and it's their baby from then on—unless, of course, the prospect calls on the utility for aid of one sort or another.

Will Help Customer

"We'll help the customer with his estimate of air-conditioning requirements, and go over the equipment he's thinking of buying with him, if he wishes," Mr. Green said. "But we never attempt to influence him one way or the other. From our point of view, it makes little difference what equipment the prospect eventually gets—he's our customer, anyway. We are interested, however, in seeing that he gets what he thinks he's getting—and what he's paying for."

"Our whole interest in this end of the business is to give the customer confidence in air conditioning."

"We're called into the picture at

all stages. Sometimes, the call is from a company selling air-conditioning equipment, who wants us to do some educational work and bolster up the prospect's confidence; other times, it's a customer entirely foreign to air conditioning, who needs a thorough educational job; still again, it may be a customer who's on the verge of buying, but who wants some advice before he makes a final choice."

Mr. Green is another who feels that men with commercial refrigeration backgrounds stand the best chance in air conditioning, from a sales standpoint.

"Men with refrigeration experience are the logical ones to sell air conditioning," he said. "You know, I've felt that way for a long time—but I haven't found many who mention it to me."

"Men who've sold commercial refrigeration understand merchandising—something that a lot of those others who are now in the field haven't had any experience with at all."

Heating and Ventilating Men

"Heating and ventilating men, for the most part—there are exceptions, of course, right here in St. Louis—shy away from the selling end of air conditioning, especially the smaller jobs. They haven't had to sell before and they dislike selling now. They like to get away from it whenever they can."

"They don't like to go out after the business—it's something they've never had to do before. They'd much rather the business came in after them."

"Of course, on the bigger jobs this system works out all right. Bids are called for, and everybody gets a chance. But on the smaller jobs, in the private offices and homes, for instance, those who understand selling—from commercial refrigeration experience or otherwise—have all the best of it."

"When you come right down to it, what have heating men actually done? They've taken the primitive fire, and put some sheet metal around it. In essence, that's about the extent of their doing. Heat of some sort has been a necessity, and these men have simply met that necessity, without trying to do more than supplying the 'come in and buy it' demand."

"Customer satisfaction, after all, is the most important thing in a young industry. We're interested in seeing that all customers for air conditioning are satisfied. One dissatisfied customer, one who feels he's been 'done in',

Air-Conditioning Equipment Orders for April, 1936 Valued at \$3,264,602

Data tabulated below is the fourth in a series of monthly statistics on the value of orders booked for air-conditioning systems and equipment, released through the office of Director William L. Austin, Bureau of the Census. Orders booked by 98 manufacturers are shown in this tabulation.

Item	Value of Orders Booked, 1936	
	April	Total, 4 Mos.
Total	\$3,264,602	\$11,667,129
Air Conditioning Group—Total	1,595,664	5,517,994
Unit Systems—		
Self-contained (shipped substantially complete).....	102,788	339,494
Not self-contained (shipped in sections, including refrigerating or cooling medium).....	541,155	1,589,003
Central-station Systems, excluding installation if installed—		
Human comfort (including refrigerating or cooling medium sold separately or otherwise for air conditioning)*.....	428,844	2,023,405
Industrial (including refrigerating or cooling medium sold separately or otherwise for air conditioning)*.....	98,632	303,785
Refrigerating or cooling medium sold to contractors or other distributing outlets (not manufacturing air-conditioning equipment) for air-conditioning systems, when such knowledge as to the application is available.....	273,932	673,876
Air washers, including pumps and motors and controls where furnished	79,160	229,936
Air filters (not including sales of filters used with machinery other than fans).....	19,137	95,685
Humidifiers	57,016	263,010
Fan Group—Total	\$1,093,267	\$ 3,581,701
Fans, including bearings, pulleys or couplings (if furnished)—		
For public and semi-public buildings.....	195,756	568,270
For general industrial uses	314,540	1,123,031
For mechanical draft	113,334	472,458
For Jobber stocks and unknown uses	52,523	174,130
Small housed and propeller fans—		
Direct connected small housed blowers with motors and control (merchandise motors)	99,391	337,424
Propeller fans, direct connected and belted (for ventilation only)	225,890	609,019
Driving mechanism for general fan use (not reported above)—		
Electric motors and controllers (manufactured or jobbed).....	84,274	258,609
Steam engines (manufactured or jobbed).....	7,559	38,760
Unit Heater Group—Total	575,671	2,567,434
Industrial Type Unit Heaters, including heating element and motors where furnished—		
Equipped with blower-type (centrifugal) fans.....	49,876	331,204
Equipped with propeller-type fans	161,005	912,005
School-Room Type Unit Heaters, including heating element and control where furnished	190,302	739,776
Indirect Heating Surface (not including unit heater surface)—		
Steel pipe coil type (manufactured or jobbed).....	9,803	13,532
Cast iron type (manufactured or jobbed).....	13,532	62,324
Copper or aluminum type (manufactured or jobbed).....	160,966	512,322

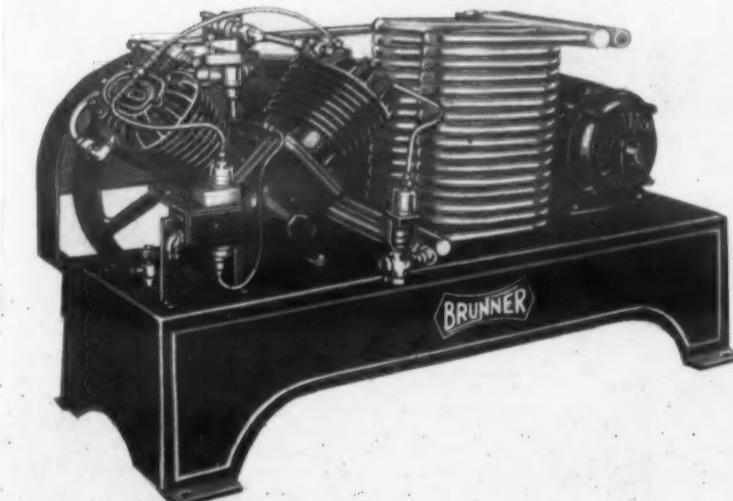
*Includes incidental equipment, such as temperature, motor, humidity, and electrical controls, dampers, outlets, etc. as are sold with each.

NO...THIS UNIT IS NOT "Wired for Sound"

BRUNNER CONDENSING UNIT W-500

a smooth-running, heavy duty model specially suited for big commercial applications...5 H.P....water cooled.

BRUNNER



Nobody has ever been bothered by "sound effects" when a Brunner Refrigeration or Air Conditioning Unit snaps on—or while it's running. Brunner engineers licked the problem of noise long ago with a sensible counterbalanced design which emits only the slightest purr. And by cutting down vibration to a minimum, friction naturally is reduced and efficiency enhanced... All in all, Brunner Condensing Units and Compressors give the kind of performance that brings satisfaction for many years to come. Get the reasons first hand by sending for complete information on the forty-seven condensing units and five compressors, ranging from 1/4 H.P. to 15 H.P. for practically every installation requirement.

Brunner Manufacturing Co., Utica, N.Y., U.S.A.

BRUNNER CONDENSING UNITS and COMPRESSORS

Ft. Wayne Dealer Attacks Long Guarantees; Others Discuss Their Sales Problems

By Phil B. Redeker, T. T. Quinn, and Winifred Hughes
Barnes Likes News Editorial On Fear Advertising

E. A. Barnes, head of the E. A. Barnes Co., General Electric dealer, is a well known and respected citizen of Ft. Wayne, having been at one time superintendent in the G-E Ft. Wayne works. He is also active in civic affairs; in fact, we had to visit the Community Fund office in order to talk to him.

With all these activities, there is one weekly piece of business which Mr. Barnes never neglects—reading ELECTRIC REFRIGERATION NEWS. He reads it on arrival and annotates certain editorial material for the rest of his organization to read.

Comment Was Needed Badly

Particularly was he impressed and pleased with the editorial on "The Fear Appeal in Advertising" which appeared in the issue of May 27.

"I felt that some comment like that in your editorial was needed pretty badly," said Mr. Barnes. "All this stuff about the 'danger' of refrigerators that have appeared in some advertising copy was bound to disturb the industry."

Took Sting from Advertisement'

"But your editorial comment pointing out some of the fallacies in that type of advertising, appearing in the same issue with one of the advertisements, certainly took the sting out of that advertisement."

Mr. Barnes likes the News policy of bringing out industry controversies and matters of policy with open discussion. He hopes that we'll continue to report the activities of groups opposed to long guarantees, and to leave our columns open to individual opinions on the subject. Mr. Barnes, as you might suspect, doesn't think much of the long guarantee situation which now prevails in the industry.

Guarantee Burden on Dealer

"The burden of making good on the guarantee is all on the reputable dealer—particularly the one who is going to be in business 5 and 10 years from now," he declared. "It means that he may be responsible not only for the merchandise he himself has sold, but also for the same make of equipment sold by another retailer."

"He also is the one who will suffer from loss of customer good-will when the user who misunderstands the warranty tries to get something he's not entitled to and is turned down."

"Why, the automobile people must be amazed at this turn of development in the refrigeration industry. Just try to get something out of the automobile dealer after his 90-day guarantee period is up."

'Kitchen Institute' Is Barnes' Best Business-Getter

George Hahn, general manager of the E. A. Barnes Co., says that sales of G-E refrigerators in Ft. Wayne are running 25 to 30% better than they were at the same time last year.

During the three times we were in the Barnes showroom (trying to find various of the executive personnel) we found store traffic rather brisk for a sweltering hot weekday. Asked how this was accomplished, Mr. Hahn's reply, in brief, was—

"Consistent advertising and promotion."

"In our newspaper advertising we don't splurge," Mr. Hahn explained, "but we are consistent with our insertions—we keep the nature of our business constantly before the public."

'Kitchen Page' Advertisement

"The weekly 'kitchen page' in one of the newspapers in which we carry an advertisement on a page which is filled with editorial material about modern kitchens—some of which we contribute—is a big help."

Probably the Barnes Co.'s best promotional aid is their Kitchen Institute, and particularly the way in which they use it. Nearly every day some group—not only of the Women's Club type, but men's civic organizations such as the Rotary Club, meet in the spacious quarters of the Kitchen Institute on the second floor of the dealer's headquarters. Sometimes mixed groups are entertained.

Prefer Men Prospects

"We'd rather have the men than the women," says Mr. Hahn. "It's hard to get men interested in the advantages of an electric kitchen, or to get them to spend some time to see a demonstration."

"But we've found that in our demonstrations at these lunches the men have evinced the type of interest that we know has led to sales."

Not all the food that is served at these luncheons is prepared at the demonstration put on by the Barnes home economists, but the processes of preparing a meal is shown, with some of the food prepared used for the luncheon that day or saved for the next.

To complete the demonstration the dishes are washed in an electric dishwasher by a maid, who is usually through with her work before the guests are ready to leave.

Not every one of those attending the luncheon are prospects. Many are users of the appliances demonstrated. Mr. Hahn is always glad to spot users among the guests, especially talkative users.

The women naturally get to talking about the demonstration, and if there is a proud user present she will

presently inform her neighbor that I have one of those and it's just grand' and the sale is practically closed right there."

Can Afford Electric Kitchens

Another important point that makes these luncheon guests a good class of prospects is that they are in the income class that can afford to purchase not only the individual appliances, but the entire kitchen ensemble.

Groups from small towns in the surrounding territory as well as local bodies are invited to use the facilities of the Kitchen Institute.

Mr. Hahn is a great believer in the "using the user" theory. All purchasers of G-E appliances are given the opportunity to make a little extra cash for themselves by supplying the names of new prospects who are closed within 60 days' time. Commissions for the users range from \$1.50 to \$5 per sale, depending on the value of the article sold.

Become Enthusiastic Boosters

"We push this idea," says the Barnes general manager, "because we've found that once a housewife has made a little extra money in this manner she is most likely to become enthusiastic about it, and in short order she is calling for a new coupon book."

To prove that the plan can produce results if followed closely, Mr. Hahn produced a stack of coupons that looked like they would keep his sales force busy all summer.

In fact, these leads obtained from users and those which the salesmen obtain through personal relationships and floor traffic contacts constitute practically the whole list of Barnes prospects.

Attitude of 'Cold Canvassing'

"We don't discourage 'cold canvassing' if the salesman wants to do it, but we don't encourage it either," avers Mr. Hahn. "We feel that under present buying conditions and the increase in the public's antipathy towards door-to-door salesmen that our men have little to gain by canvassing, particularly if they have an active list of prospects."

Mr. Hahn isn't much worried about the competitive situation in Ft. Wayne. He thinks that some manufacturers have spread their franchises over too many dealers, with the result that the dealers individually have to chisel prices to make sales, but he looks for a generally improved situation in this respect by next year.

Bonus Will Boost June Sales, Norge Distributor Believes

With sales already showing a definite increase over those of the 1935 refrigeration selling season, Norge dealers operating under the Gibson Co. distributor at 245 W. Main St. here, are looking towards a new high in domestic unit sales this June, following the payment of the soldiers' bonus money, according to E. W. Smith, manager of the distributorship.

Operating as a branch of the Gibson Co., Norge distributorship in Indianapolis, the Ft. Wayne company has 50 dealers, five of which are in this city, and the remainder located in nearby towns. The branch office was established here over two and a half years ago to work in closer cooperation in aiding Norge dealers in this territory in their selling jobs.

Handle Norge Exclusively

"Our dealers all handle the Norge line exclusively. We have found that if the dealer carries two or three other lines, the distributor's salesman spends so much time getting the dealer to push his line, that he slighted other dealers in the territory," said Mr. Smith. "Besides," he added, "the one-line dealer naturally does a better selling job for us than the one whose attention is divided."

For its dealers in Ft. Wayne the distributorship maintains a centralized service department.

"We just started the plan about two months ago, and it is working out very well. We service and install all Norge boxes sold in the city."

"The dealers here have only a floor stock of display models. They telephone orders into our store, and we deliver the new box and install it. Then our service man calls back within 36 hours to see that the machine is running correctly, and that its new owner knows how to operate it."

Like Central Service System

"We like this plan," Mr. Smith continued, "because it enables us to be certain that each refrigerator sold here is giving the right kind of performance. The dealers are satisfied with our centralized service system, because it is less expensive for them. We charge a \$3 fee, and the dealer would otherwise have to pay that much just for the delivery alone."

New dealers added to the Gibson selling organization are put through a one-day sales training course in which the operation of the Norge unit is explained for them, and they are taught selling methods set up by the manufacturer.

Following this, the company's wholesale men contact them regularly.

Their work includes holding training course meetings for dealer salesmen, aiding the dealers in closing sales, or in demonstrating the refrigerator in an effort to sell difficult prospects.

Dealer meetings are held in Ft. Wayne at frequent intervals, at which a factory representative discusses new selling or promotional campaigns, and the Norge film is shown.

Cooperative Advertising Program

The Gibson Co. also aids its dealers with cooperative newspaper advertising, inserted in papers in the dealers' towns. Additional promotional help is provided through the company's home economist, Miss Reiser, who goes out through the territory and conducts cold cookery schools in the dealers' stores.

Terms covering a 3-year period are most popularly used in the great percentage of dealer sales, according to Mr. Smith. Sales are financed through various financing firms, and approximately 80% of the sales are on a trade-in basis, in which the purchaser's old ice box is taken as down payment by the finance company.

Product name, economy, and appearance of the refrigerators are listed by Mr. Smith as the three leading buying motives of the 1936 refrigerator purchasers.

Very Little Commercial

"While the Gibson branch store handles some commercial refrigeration equipment, the company has done very little business in this line, Mr. Smith stated. "We found it both too expensive and too complicated to do much in the commercial line with our present set up here," he said.

"No two commercial installations are alike, and consequently it requires a staff of specially trained men to do a good commercial job. It is expensive because one call might come from one part of the city, and the next one from the other side, and the men have to keep rushing around."

The difficulty of educating the dealers in the correct method of merchandising commercial equipment has also curtailed development of commercial equipment sales, the branch manager said.

Stucky Bros. Sales Lag After Good May Record

After sales of 55 household refrigerators during May, business has shown some signs of slackening up during the past couple of weeks, according to Joseph Stucky, head of Stucky Bros., Kelvinator dealer in Ft. Wayne.

Mr. Stucky was in a hurry to get home to lunch when we called, so we didn't get much of a chance to make conversation with him.

He did admit, however, that most of his competition was of a purely price nature, and that the great majority of it came from Coldspot.

Hard to Sell 'Up'

"You know," he said, "it seems like people have got into their heads that they can buy a good enough refrigerator for around \$150, not any more. And it's awfully hard to sell them anything that costs any more than that."

Stucky Bros., just getting set up in Kelvinator commercial, has been in the household refrigerator business for four years, Mr. Stucky said. The firm operates in two cities, Mr. Stucky's brother having charge of another branch in Huntertown.

Mr. Stucky's main problem in the household field this year has been that of personnel—finding men who'll stay at the job for at least six months, they'll want to stay."

"We are trying a new bonus plan for our men here, at the present time (the distributorship has a retail outlet at the main store.) It involves salesmen payment on a straight commission basis, with a 2% bonus on sales, payable at the end of a six-month period," he explained.

Leonard distributor for five years, the Lines Co. has 23 dealers located in 14 counties in the Ft. Wayne territory. Next to the continual contacting done by the distributor's wholesale man, the firm's most important method of keeping its dealers supplied with new sales hints, and peped up, are the monthly dealer meetings held at the Lines Co. headquarters here.

the throes of selecting a man to oppose President Roosevelt, Ft. Wayne was in the midst of a boom brought about by the activity of its leading local industries, and Mr. Paul was still busy selling Frigidaire refrigerating equipment.

In fact, Mr. Paul, on the basis of present sales, expects to sell 600 units this year—which is a tidy total for a city like Ft. Wayne.

Secret of Mr. Paul's sales lies probably in his knowledge of the people of Ft. Wayne. Hardly a person passed his showroom about whom he could not supply some information. And apparently many of the sales he gets are from tips obtained from a wide circle of friends.

Political Tie-up Helps

There's a good reason for Mr. Paul's wide knowledge of Ft. Wayne citizenry. He's in politics (the Hoosiers really take their politics seriously, we learned), and was making plans to attend a state convention when we interviewed him. But there are more tangible benefits than merely getting to know people. Says Mr. Paul:

"The State lets a lot of good contracts for refrigerating equipment and it doesn't do any harm to know when it's going to be done and who's going to do it."

Mr. Paul thinks that within a year the dealer situation in Ft. Wayne will be on a much more stable basis than it now is; and that a much better situation with respect to price maintenance will be realized.

Salesmen Lack Staying Power, C. H. Lines Complains

Two things—salesman turnover, and the fact that spring sales have been less than his expectations—are about the only black spots in the picture which C. H. Lines, head of the C. H. Lines Co., 136 Washington St., Leonard distributor here, gave of the selling activities of his organization.

"Our sales have increased approximately 20% over those of last spring, but I expect them to be at least 40 or 50% greater," the distributor stated.

Failure of the weather to come through with the expected June heat is partly responsible for the lag in sales, he believes.

Trouble Holding Salesmen
 "The biggest trouble we have, is holding salesmen. If their sales are slow in picking up, they don't stay at the job long enough to give it, or themselves, a chance. I believe that if they put all their efforts into the job for at least six months, they'll want to stay."

"We are trying a new bonus plan for our men here, at the present time (the distributorship has a retail outlet at the main store.) It involves salesmen payment on a straight commission basis, with a 2% bonus on sales, payable at the end of a six-month period," he explained.

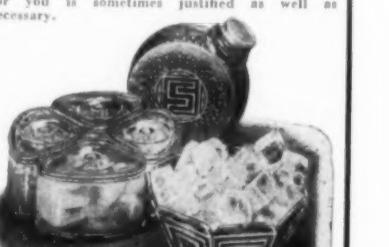
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Get Results from Meetings
 "There isn't anything unusual about the way we conduct the meetings, but we get a lot of good from them, and (Concluded on Page 15, Column 1)

MERCHANDISING PLAN for REFRIGERATORS Equipped with SCURLOCK KONTANERETTE KITS

For All Refrigerators
 Plan No. 3
 * * *

The straight give-away of a Kontanerette Kit to your better customers after they have been trading with you for a long time in appreciation of their patronage when they purchase a new refrigerator or they secure a new customer for you is sometimes justified as well as necessary.



Mr. Dealer:
 We have tried to offer suggestions toward the merchandising of Kontanerette Kits through a short series that you have read the past few weeks. If you are still interested in further plans to offer the consumer . . . see your distributor or write us direct.
 Approved by Good Housekeeping Institute
SCURLOCK KONTANERETTE CORP.
 1477 Mds. Mart - Chicago

LEADING REFRIGERATOR MANUFACTURERS BUY WINTERS & CRAMPTON HARDWARE

Your manufacturing costs can be kept down to a minimum in styling refrigerator hardware to harmonize with the appearance of your cabinet, if you will consult our staff of engineers as soon as you begin to consider cabinet designs for 1937.

Our Engineering facilities have made it possible for us to cooperate very closely with designers and engineers of the leading manufacturers.

WINTERS & CRAMPTON Engineers are responsible for most of the latest improvements and developments in hardware design and construction. You too can enjoy the advantages which an experienced engineering staff can offer.

It will pay you to contact our organization.

Winters & Crampton Corporation
 BOX 231
 GRANDVILLE • • • MICHIGAN

Like Central Service System

"We like this plan," Mr. Smith continued, "because it enables us to be certain that each refrigerator sold here is giving the right kind of performance. The dealers are satisfied with our centralized service system, because it is less expensive for them. We charge a \$3 fee, and the dealer would otherwise have to pay that much just for the delivery alone."

New dealers added to the Gibson selling organization are put through a one-day sales training course in which the operation of the Norge unit is explained for them. We charge a \$3 fee, and the dealer would otherwise have to pay that much just for the delivery alone."

Following this, the company's wholesale men contact them regularly.

Frigidaire Distributor Sets 600-Unit Goal for '36

Last time we saw L. E. Paul of the Refrigerating Equipment Co., Frigidaire distributor, President Roosevelt had been in office little more than a month, the public was still dizzy from the effects of the bank holiday, and Mr. Paul was very busy selling Frigidaire equipment—both commercial and domestic.

Leonard Distributor Has Dealers Bring Wives to Meetings

(Concluded from Page 14, Column 5) so do our dealers and their salesmen," Mr. Lines said. "We invite them to each meeting, and tell them to bring their wives along. Average attendance usually runs between 40 and 50, and it is frequently higher than that.

"We run through the manufacturer's film depicting the manufacturing process used in putting out a Leonard, and setting up selling points. We also discuss sales problems—and here is where the wives come in—we call on them to answer questions—this gives the salesmen a first hand chance to get the woman's point of view."

"At the last dealer-meeting which we held, we had over 70 present. We talked about the economy of electric refrigeration versus ice refrigeration, and called on the wives to back up our assertions with their experiences.

"The men get a lot out of these meetings. We know that they like them because many of the same ones keep coming to meeting after meeting. We try to get them to bring up their sales troubles, and in this way we get a fairly good line on what they are doing. Of course, not all of them will get up and air their views, but some will, and getting the wives in on the discussion keeps things going."

Dealer Meetings Informal

Dealer meetings are conducted as informally as possible, and usually end up in more or less of a social gathering. Mr. Lines said. "We serve a lunch and plenty of beer, and the women like the food, and the men the beer, so that makes everybody happy."

Right now the Lines company is running a dealer contest in which prizes amounting to \$100—the first of which is a \$40 cash prize are offered to high-sale dealership during the contest period. Each retail store has a set quota, and prize awards are determined by the amount of quota sold.

Radio and Contest Tie-up

Leading promotional activity now being sponsored by the Lines Co. is a series of four half-hour programs broadcast over station WOWO here, once a week until July 4.

"We have a contest in connection with this program also," Mr. Lines said. "In it we are giving away 14 cash prizes to apply against the purchase price of a new refrigerator. This is mainly designed to get new prospect names for our dealers."

Another contest, aimed at increasing dealer prospect lists' is also being sponsored now by the distributor. Following the manufacturer's promotion campaign it has as a prize a \$164 Leonard refrigerator, offered on a drawing basis. Participants obtain the contest blanks from the dealer and the only requirement for entering is that the prospect must write in the space provided, whether or not he owns a refrigerator or range.

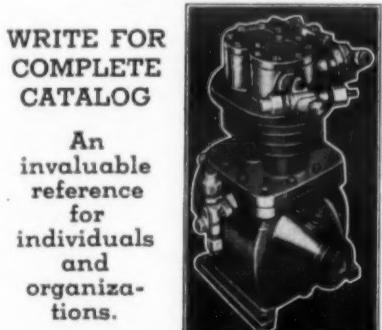
Window Displays Effective

"Window display is our best advertising in this store," Mr. Lines said. "We concentrate on getting eye-appeal into our windows. Our location is ideal in the sense that the shopping trade is constantly passing our door, and this results in many sales."

A sales manager and three salesmen



1/6 to 15 H.P. Standard High, "M & E" Quality



10th Successful Year in Refrigeration. Est. 1866

MERCHANT & EVANS CO.
PHILADELPHIA

comprise the staff of the Lines Co. store. The men have open sales territories, and use cold canvassing as the chief means of getting new prospects. Prospect cards are filed in the office, and 30 days protection is given on each name field.

Schoolboys Get Prospects

Additional prospect getting feature, aimed at obtaining new leads for the distributor salesmen, is the schoolboys' contest which started last week and will last till August 8.

"We are giving that little automobile out in front of the store as the prize. For each prospect lead turned in from which we make a sale, the boy who turned in the name will receive as many votes as there are pennies represented in the purchase price of the box," Mr. Lines explained.

"We've had the car out there for a week with signs on it, and the campaign was written up in our newspaper advertising this week."

As a final hard-to-be beaten method of making junior salesmen of local children, the distributor is going to let some little boy drive the car around the city, he said.

While Mr. Lines claimed that sales this season were slow, on the whole, he said that May sales were ahead of those for that month last year. "We sold 94 units during May, and our last year's May sales were 79," he said.

The one outside factor that has done the most to boost appliance sales throughout Ft. Wayne, according to Mr. Lines, is the reduction in electric current rates. "The power company brought the rates down to 2 cents, a couple of months ago, and that's led a great number of people who did not feel that they could afford electrical appliances before, to purchase this spring," he declared.

Plan Electric Kitchens

"If our sales this season come up to our expectations, we plan to install a complete electric kitchen here in the store," the distributor stated. "We will remodel this room, so that the kitchen will take up one entire end."

The room referred to occupies half of the store space, and forms a complete refrigeration display section, independent of the main part of the store. It contains a complete display of Leonard models. Providing an ideal show-room arrangement, the side of the room which faces Washington St. is made up of window display space.

Eye-appeal, the outside appearance of the box is the leading buying motive behind purchases of electric refrigerators today, believes Mr. Lines.

"The average housewife first considers the beauty of the box, then the conveniences it will afford her, and finally the operation costs," he said. "Five and six-cu.-ft. boxes are the most popular sellers in this city, with the 6 cu.-ft. boxes slowly gaining an edge on smaller boxes."

Mechanical Details Overplayed

J. E. Samsen Declares

"The trouble with the electric refrigeration selling set-up, in this town, and in every town, I think, is that the salesmen are putting too much emphasis on the mechanical details of electric refrigeration, and the customers not only aren't interested, but they don't understand what it's about," stated J. E. Samsen, head of the Samsen Radio & Electric Shop, at 209 W. Wayne St., Grunow dealer here.

As a result of this over-emphasis on mechanical construction, both in manufacturers' advertising, and in salesmen's talks, people who are in the market for electric refrigeration get confused, and they don't know what they want, or where to buy it. This is the chief cause of lost sales, Mr. Samsen stated.

Prefers Auto Selling Methods

"Electric refrigerators should be sold the same way automobiles are sold," believes Mr. Samsen.

"When you go to buy an automobile, the salesman doesn't launch into a detailed account of the motor's superiority, its method of operating. They sell on the name of the car. This same idea," Mr. Samsen claims, should be carried into electric refrigeration merchandising.

"I don't mean that it should be touched lightly, and enlarged upon only when the customer evidences an exceptional interest in that phase of the box."

Company Name First

In place of this theory of salesmanship, Mr. Samsen believes that initial stress should be placed upon company name, followed by the price, or economy story.

The Samsen Co. has handled the Grunow line here for the last three years, and has, in this time, added the G-E Hotpoint line of electric refrigerators.

"We carry electric refrigeration merely as a side line, our principal interest is in radio sales," the store head claimed.

There has been an increase in the company's electric refrigeration sales

this spring, particularly on the Hotpoint line, Mr. Samsen said.

"We've sold about 30% more boxes than we did last year. The reason behind this, I believe, is because the refrigerators (Hotpoint) are made here, and because they have a better acceptance here."

Believes Competition Helps

Taking exception to the opinion frequently expressed by dealers on the competitive angle, Mr. Samsen said that he believed that if there were three or more other Grunow dealers operating in Fort Wayne, his sales would be improved, rather than curtailed by the competition.

"Their advertising and displays would create a better acceptance, and get the product before the people's minds," he declared.

Another point on which Mr. Samsen differs with the manufacturers advertising (generally speaking) and methods of merchandising, is that in regard to long payment plans.

"They've made too much of long selling plans, if 3 and 2-year payment terms weren't featured so prominently, people wouldn't ask for them. Naturally though, when the extended plans are offered, people are going to take advantage of them," he said.

Most Sales Closed at Night

Two electric refrigeration salesmen are employed by the Samsen Co. Advertising in local newspapers is the principal method used by the company to promote its refrigeration sales.

The greatest percentage of the company's sales are sold at night, the dealer said.

"Few women buy electric refrigeration alone. They want their husbands to see what they are getting, and we find that it is easier to sell when both the husband and wife can come into the store together in the evening," he said.

Dulux-Finished Units Will Feature Show

ATLANTIC CITY, N. J.—An electric refrigeration show featuring the 14 makes of refrigerators that use Dulux finishes, will be presented at the Du Pont Exhibit on the Boardwalk here during the week of June 22 to 29.

Three times daily during the show, Miss Elizabeth MacDonald, formerly manager of the consumer research department of Frigidaire, and a consultant on TVA projects, will speak on household refrigeration, covering topics such as: caring for the refrigerator, intelligent buying of equipment, preparing refrigeration dishes, economical meals, and kitchen arrangement.

In the show room, each of the 14 refrigerators will be on display, identified by blow-ups of the manufacturers' trade marks. The makes represented will include: Westinghouse, Stewart-Warner, Apex, Frigidaire, General Electric, Hotpoint, Fairbanks-Morse, Coldspot, Ice-O-Matic, Crosley, Trukold, Potter, Norge, and Mayflower.

Refrigerators, sinks, cooking wares, plumbing fixtures, and table tops will be among the household articles displayed to demonstrate how fused glass (porcelain enamel) surfaces are used.

Large sections from tanks lined with porcelain to protect the contents from deterioration and preserve the tank metal from chemical action will be exhibited showing the use of this product in the industrial field.

The enameling process will be explained at the exhibit through the use of a porcelain enameling furnace where visitors may write their names on souvenirs and have them fired while they watch.

A model grocery store partly of enamel fixtures and partly of wood will be displayed to demonstrate the advantage of porcelain fixtures.

The building is being constructed by Ferro Enamel Corp., of Cleveland, in cooperation with American Rolling Mill Co., Benjamin Electric Mfg. Co., Toledo Porcelain Enamel Products Co., Davidson Enamel Products Co., Erie Enameling Co., C. G. Hussey & Co., Haskelite Mfg. Co., and B. F. Drakenfield & Co., Inc.

Cleveland Exhibit to Show Porcelain Uses

CLEVELAND—A building constructed of Haskelite will house exhibits of the porcelain enameling process and its uses during the 100 days of Cleveland's \$25,000,000 Great Lakes Exposition which opens June 27 along a mile of Lake Erie's shore.

This will be the first time that Haskelite has been used for complete outside wall coverage. It consists of pre-cut sections of plywood backed by metal on one side, and on the other by porcelain enameled metal to combine the wearing qualities of enamel and metal with the insulating values of wood.

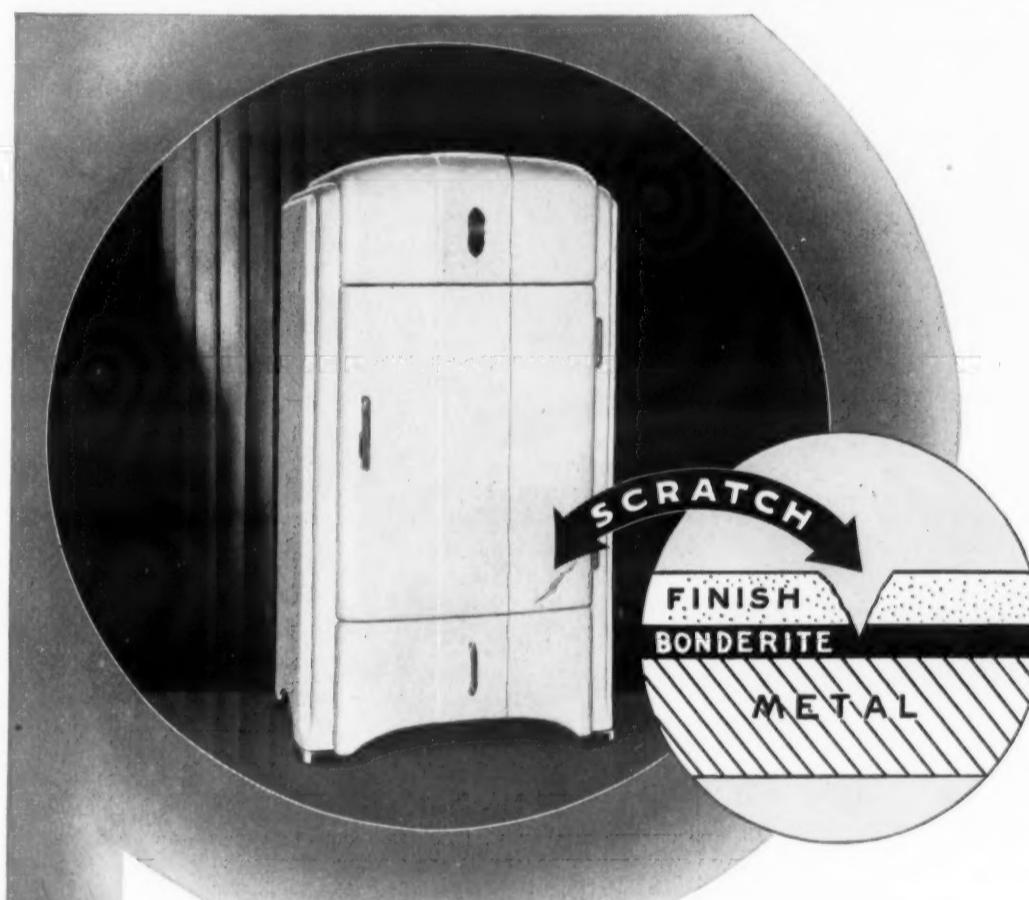
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With Bonderizing between the metal and final finish, the refrigerator is given extraordinary protection.

Bonderizing not only anchors the finish, preventing chipping and peeling, but it is an unseen barrier that stops the spread of rust around accidental scratch or dent.

PARKER RUST-PROOF COMPANY • 2197 East Milwaukee Ave., Detroit, Mich.



A new book, showing what a salesman should know about Bonderizing, will be sent on request.

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The Evolution of the Independent Service Company

LAST WEEK Frigidaire Corp. formally announced that it will actively market parts for its refrigeration equipment to independent service men. This recognition of the place of the independent service man in the industry by one of the oldest of the leading manufacturers is of considerable significance to those who are familiar with the history of manufacturers' policy on service.

Major manufacturers have from the beginning strived to keep service activity within the scope of their own dealer organization. They took aggressive steps to make the term "authorized service" mean something to the public, and they blocked many efforts to set up independent service operators by refusing to give out information or to sell parts to outsiders.

Good arguments could be advanced for this policy, particularly in the early stages of the industry. Manufacturers franchised dealers for both sales and service. The policy was to give the dealer exclusive rights in his community and make him responsible for customer satisfaction.

Furthermore, makers of electric refrigerators were wary of allowing any untrained mechanic to make adjustments to equipment. They provided factory schools to train an adequate number of service men for their dealers.

This was all well and good when the industry was young, when dealer organizations were stable and closely controlled, and when the factories could hardly train service men fast enough to meet the demand. But as the years rolled by the situation changed in several ways.

The evolution of the independent service man may be attributed to a combination of circumstances. Paradoxically, the advent of the sealed unit, which could not be serviced in the field, may be listed among the factors which directly, or indirectly, accelerated the growth of independent operators.

Certainly the appearance on the market of the quietly-running, sealed machine had a marked effect upon the production methods in the factories making the conventional, or open style, refrigerators. Something had to be done to meet the new competition and the answer was found in precision methods. The result was that less service was required in the field for practically all makes.

On top of that came the depression. While household sales continued, the slump in business was felt immediately in commercial refrigeration circles. Thousands of grocers, meat markets, restaurants, etc., passed out of the picture and, for a time, dealers were repossessing old commercial units faster than they sold new ones.

Thus the demand for service men dropped sharply and many experienced men were laid off. Training schools were discontinued and service department managers discouraged all activities which would tend to bring new service men into the field. For example, the News found it practically impossible to get any assistance in providing educational material for this group.

These unemployed service men, unable to find a "job," went out to find whatever work they could, in the line in which they had been trained. In some instances they started out by taking work on a contract basis for an apartment building or group of apartments, getting in return their living quarters and perhaps a small fee. Others set up shops of their own.

It is significant that the evolution of the independent refrigeration service company was one of the very few instances where the depression produced a new class of independent business men. Where the forces of the depression generally tended to make many individuals seek government aid or direction, refrigeration service men were the sort who set about to solve their own problems.

Starting in 1933 service business again became good, due to the fast-mounting volume of household refrigerator sales, and the start of a revival in commercial refrigeration installations. The ranks of the service men meanwhile were being swelled by mechanics from other fields, to whom refrigeration was no longer such a mystery because of a growth of public education on the subject. Privately operated refrigeration schools had also entered the picture to train mechanically inclined young men for careers as refrigeration service engineers.

Appeals were made to ELECTRIC REFRIGERATION NEWS by its readers to provide service information for use in the field, with the result that a program was planned to meet the demand, culminating in the publication of the MASTER SERVICE MANUAL, by K. M. Newcum, first in a serial form in the News, and later in book form. A new series of service articles by Mr. Newcum on various makes and models was started in last week's issue and a new manual on Commercial Refrigeration Service is now being compiled by the same author.

During the past two years refrigeration supply jobbers have been coming into the field. Now there are one or more concerns in each of the larger cities with stocks of parts and supplies to meet the needs of local service men. Some issue catalogs and handle a large volume of mail order business.

But with all this impressive development, the larger manufacturers have refused to furnish repair parts to the independents, except through their regularly-appointed distributors who have naturally been inclined to exact a liberal profit on such transactions.

This condition created a tempting opportunity for the manufacturer of parts and it was not long until a great variety of belts, gaskets, valves, controls, and other replacements were designed to fit the various makes and models in use. This has put the manufacturer of complete units "in the middle" where he must either take care of independents or lose control of the replacement business for his own equipment.

Under the circumstances, recognition of the independent service man by the leading manufacturers was inevitable. From the standpoint of maintaining public goodwill towards electric refrigeration it is a good thing, for the need of independent service men to insure all users getting good and prompt service on their equipment has been demonstrated.

Letters

Courageous Editorial

William B. Henderson
Southern Building
Washington, D. C.

June 5, 1936

Mr. Cockrell,

I did want to tell you of my admiration for your courageous editorial on the Grunow refrigeration matter in the May 27 issue of "ELECTRIC REFRIGERATION News". It confirms what most of us have—that you place the welfare of the refrigeration industry above all other considerations.

WILLIAM B. HENDERSON

Grunow Has a Right to Advertise His Product

The Harry Alter Company
National Distributor of Refrigeration Supplies for All Makes
1728 So. Michigan Ave.
Chicago

June 12, 1936

Publisher:

Without attempting to enter in the Grunow Safety advertising controversy, I want to tell you that you and the News have handled this delicate situation honestly and fearlessly.

Grunow has a perfect right to advertise his product and feature any sales advantage he can develop around his refrigerator. If such advertising steps on other's toes, so what? Certainly it's no novelty in American business to see competitors slam each other around in the press with paid space.

You are honest and independent in running Grunow's advertising and I admire your courage in commenting on it editorially. Accepting the "ad" and then "censuring" it in your editorial definitely proves your fearless independence.

More power to you.

HARRY ALTER

What Has Grunow Contributed to Safety?

H. R. Van Deventer
Patent Attorney
Licensed Professional Engineer
342 Madison Ave.
New York

June 11, 1936

Publisher:

As a "neutral observer" I am interested in your editorial "The Fear Appeal in Advertising" appearing in the May 27, 1936 issue of the News and Ruthrauff & Ryan's answer thereto in the June 3, 1936 issue.

As a consulting engineer and patent expert working in refrigeration for many years, I am familiar with commercial refrigerants and their use, and have carefully followed the advertising relative thereto that has appeared particularly with a view to determining whether or not it presents the facts in regard to safety.

The Grunow situation seems not only to be an example of execrable taste but to be one of those situations where having no definite advantages to talk about, the agency had to create some out of more or less thin air.

Many of the toothpaste and cigarette manufacturers have been guilty of this same bunkum. Doctors have long stated that no toothpaste has the slightest effect on preventing tooth decay, yet if one would believe some of the toothpaste ads they would think some of these pastes would keep a man's teeth perfect until he had long passed the century mark.

Cigarette advertising is often the same. We are told all about the psychological and physiological effect of cigarettes in definite terms, whereas careful medical research for many years has failed to establish one iota of scientific evidence one way or the other in respect to these points.

Advertising to the statement in Messrs. Ruthrauff & Ryan's letter that Mr. Grunow is the man who has pioneered protection in a household unit, this is rather laughable to some of the old timers in the business who not only have devoted years and years to the intensive study of the question of obtaining a safe refrigerant, but who also expended hundreds of thousands of dollars in research for such a refrigerant long before Mr. Grunow entered the refrigeration field. It would be interesting in this connection to know just what Mr. Grunow had to do with the

development of Carrene, for his unit is but one of a number of refrigeration devices using this refrigerant developed some time ago by a company with which, so far as I am aware, Mr. Grunow has no more connection than I have, he simply being a purchaser of Carrene.

It would appear that Mr. Grunow has been made the victim of some enthusiastic ad writer who had a bright idea and did not get the facts. So far as I know, Mr. Grunow is a business man formerly prominent in the radio field and lays no claim to having developed anything in refrigeration.

Messrs. Ruthrauff & Ryan stated that their position is that when one of their clients has an advantage over other competitors as obvious as this one (Grunow's urge to protect the public) that they would be negligent of their "duty" if they failed to point it out in strong advertising terms.

In this connection I might observe that it does not appear from anything that can be found out that in so far as protection to the public is concerned, Mr. Grunow's unit has merit in excess of that found in a number of other makes of units. Further, in regard to the danger of refrigerants in household equipment, it is positively absurd to attempt to magnify or even to assert that such danger is a real one, for although there are over seven million household refrigerators in use today, the total number of deaths from refrigerants used in household service is practically negligible from a statistical viewpoint.

I made diligent search recently in connection with some litigation in which I was engaged to determine the actual number of deaths due to accident with household refrigerators and I was unable to find any record whatever of any death or injury that had occurred due to the use of a hermetically sealed unit, or any death or injury that had occurred due to the use of a modern single household unit of any type (including stuffing box and absorption machines) and found that the few deaths that had occurred were in connection with multiple systems and the like, not employing individual units and in practically every instance these deaths were caused by improper handling or by accident beyond control of the manufacturer of the equipment, and the equipment would now be regarded as obsolete and is of a type no longer offered to the public.

In the current (June) issue of Refrigerating Engineering, on page 356, appears an article by Harry D. Edwards, chairman Refrigeration Safety Code Committee, entitled "Refrigerants—their uses and regulation." Mr. Edwards states that the Health Department records of New York City show 345,000 installations of household refrigerating machines at the end of 1934, of which 241,000 use sulphur dioxide and that the total accidental deaths from the period of 1918 to 1934 inclusive from the use of sulphur dioxide was three.

This high degree of safety in the use of household refrigeration has been due in a large manner to the cooperation given by manufacturers to engineers and officials responsible for the various codes under which such equipment is manufactured and permitted to be used.

In case Messrs. Ruthrauff & Ryan do not know it, they should be told that Mr. Grunow's machine, as well as any other offered for sale in the main cities in the United States must comply with certain rules and regulations promulgated by the various municipal authorities and that the preparation of these codes was started by eminent engineers whose work was fostered by the various engineering societies and that this was done and these codes formulated many years before Mr. Grunow entered the field.

It would be of interest in this connection to know what, if anything, Mr. Grunow ever contributed to the making of a code and what, if anything, he ever personally contributed to the making of any device or refrigerant that is in any way different from the safety standpoint from that which is done by a large number of manufacturers.

It is to the many eminent engineers and to the cooperation of prominent manufacturers and scientists working with refrigerants to whom thanks is due for the safety now enjoyed by the public in the use of household refrigeration, and the inferences contained in Messrs. Ruthrauff & Ryan's letter and the Grunow advertising is unfair to those who really did the safety job.

If Messrs. Ruthrauff & Ryan want to write some more "scare" copy, one of the best things they can pick on is our old friend, the family bathtub. According to statistics (which can always be made to uphold pretty nearly any kind of a contention, depending on how they are used) bathtubs are actually responsible for many more deaths than nearly any other device in the house. I suppose somebody will come along directly with a rubber bottom tub and then we will be nauseated by some "safety" advertising about bathtubs.

Another thing that warrants a

"safety" campaign is our old friend, the kitchen gas stove. From 1918 to 1934 inclusive, the New York City records show about 8,000 killed by gas. Gas stoves kill more people every six months than the entire household refrigeration industry has killed in the last 50 years, yet it would hardly be fair to the gas stove people for some competitor of theirs, say an electric range manufacturer, to start one of these so-called "safety" advertising campaigns.

I want to congratulate you on your courage and initiative in publishing the editorial. If more publishers took this position, a great deal of advertising bunk would be eliminated, in spite of the fact that some copy writers think they are smart in hiding their paucity of real ideas in a welter of meaningless phrases and allegations unsupported by a single fact.

H. R. VAN DEVENTER

Challenges "Exclusive" Rights to Carrene

Richard C. Fassnacht
Englewood, N. J.

June 6, 1936

Publisher:

As an old subscriber to your trade paper, I have always found your editorials interesting and timely. Lately, the mention of Carrene has hit close to home.

I'm wondering whether the objection to the "safety" feature of Grunow's advertising isn't based on the fact that they, Grunow, have an "exclusive" feature in Carrene based on their arrangements with Carrier Engineering Corporation.

The industry will be interested in knowing that Carrier has no more exclusive rights to Carrene than Grunow has in domestic refrigeration use. The writer owns a substantial interest in the original patent covering methylene chloride for industrial uses and Carrier have just been served in the Jersey Courts with an infringement notice.

We have gone a step further and have obtained new patents, one covering methylene chloride as an industrial liquid, No. 1,966,881 attached. Perhaps you would be good enough to let us have your reaction on the above.

RICHARD C. FASSNACHT

*Editorial Note: Patent No. 1,966,881 issued July 10, 1934 to Geza Braun, New York, N. Y., assignor to Paul J. Sartain, Philadelphia, Pa., Richard C. Fassnacht, New York, N. Y., and Richard C. Schwoerer, Philadelphia, Pa., contains 10 claims (Claims 252-5) on "Industrial Liquids."

Following are extracts from the patent record:

"This application is a substitute and continuation in part of my co-pending application Serial No. 537,875, filed May 16, 1931.

"It is an object of this invention to provide an industrial liquid that will be non-explosive, non-combustible or non-flammable, and which will be adopted to a variety of uses.

"It is a further object to provide a liquid which will be non-poisonous if by accident it or its vapors should escape from the apparatus with which it is used, into the atmosphere to be breathed by the attendants.

"It is a further object to provide a fluid which will be non-corrosive to the common metal from which machinery is made, such as steel, iron, copper, brass and aluminum, and which will be chemically stable in their presence even though raised to substantial temperatures or subjected to long contact therewith.

"Among the most useful of the high boiling point compounds are carbon tetrachloride, methylene dichloride, di-chloroethylene, and trichloroethylene. Among these compounds, methylene chloride is the most important. Methane chloride, however, even when free from deleterious ingredients, such as carbon tetrachloride and chloroform, is nevertheless somewhat corrosive to metals such as iron. This corrosiveness is due to the fact that, when methylene chloride is heated in a metal container, as for example, in iron, for a long time, especially in the presence of moisture, it decomposes slowly, yielding hydrochloric acid and chlorine, which attack the metal.

"In accordance with this invention, I have found that certain unsaturated hydro-aromatic compounds, while sufficiently inert to methylene dichloride to permit them to remain dissolved therein for long periods of time without interaction, nevertheless are so completely responsive to chlorine and hydrochloric acid that they will chemically bind the minute traces formed, and thus prevent the corrosive action.

"By unsaturated hydro-aromatic compounds I refer to aromatic compounds in which one but not all of the double bonds has been broken by hydrogenation, such as cyclopentene, cyclohexene, pinene, dipentene etc. I have found particularly desirable results, however, in the use of pinene. This compound, dissolved in concentrations of from 1% to 2%, prevents all destructive action by methylene chloride upon the containers."

Air Conditioning

ACMA Applications Code Prescribes Standard Practice For Installation Estimates

A. Scope and Purpose

This code is limited to application engineering standards and practices for determining the conditions and the loads for which to design systems for conditioning air for the comfort of persons, for installation within the United States.

These are minimum standards and are to be construed as defining recommended practice, rather than as hindering progress, or as preventing the use of other standards where such are justified by the economies of a case and where departures below good practice minimums are made clear to the buyer.

B. Name

The name "Air Conditioner" or "Air Conditioning" shall not be applied to any air treating combination which is not designed to embody the minimum complement of functions as defined below in Paragraph "C." If a system embodies less, it shall be called by a name which describes only the functions performed, and does not incorporate the words "Air Conditioning" or "Air Conditioner."

C. Definitions

1. Application engineering standards for air conditioning are those relating to conditions and factors which form the basis of design load estimating and specifications of performance. These are distinguished from standards of apparatus design, of installation practices, of trade practices and of safety.

2. The design load is the capacity required of the apparatus to maintain specified conditions inside when specified extreme conditions of temperature and humidity obtain outside and when all sources of load are taken at a maximum that will occur coincidentally, during periods of outside extremes.

3. Design inside conditions are the dry and wet bulb temperatures (or relative humidity) specified to be maintained inside at the time of occurrence of the design load.

4. Design outside conditions are the dry and wet bulb temperatures (or relative humidity) specified for design load computation.

5. Comfort air conditioning provides ventilation, air circulation, air cleaning and maintains temperature and humidity for the comfort of people.

6. An air conditioning system provides ventilation, air circulation, air cleaning and equipment for maintaining temperature and humidity within prescribed limits.

7. An air conditioner is a specific combination consisting of means for ventilation, air circulation, air cleaning and heat transfer with control means for maintaining temperature and humidity within prescribed limits.

8. A cooling (summer) air conditioner is a specific air treating combination consisting of means for ventilation, air circulation, air cleaning, cooling and dehumidifying with control means for maintaining room temperature and humidity within prescribed limits.

9. A heating (winter) air conditioner is a specific air treating combination consisting of means for ventilation, air circulation, air cleaning, heating and humidifying with control means for maintaining room temperature and humidity within prescribed limits.

* Taken from A. S. H. E. code for Rating & Testing Air Conditioning Equipment.

D. Design Load Factors

The following shall be specified as a basis for the calculation of design loads.

1. Design inside conditions.

2. Design outside conditions.

3. Number of occupants and other sources of substantial load from within doors.

4. C. F. M. per person assumed for ventilation.

5. Time of day at which maximum load is estimated to occur.

6. Class of activity assumed for occupants.

Calculations of design loads shall include the following sources of heat loss and heat gain:

(Continued on Page 18, Column 3)

TEMPIRE NEW CATALOG

This illustrated catalog contains comprehensive descriptions of all Temprite water, beer, and beverage cooling units, cabinets, control valves, equalizer tanks, and accessories.

In addition, it includes curve charts, tables of operating data, and sample calculations covering standard specifications, as well as much information on special adaptations. It is in reality a combination catalog and engineering manual.

Complimentary Copy Mailed on Request

TEMPIRE PRODUCTS CORPORATION
1349 EAST MILWAUKEE AVE. - DETROIT, MICHIGAN
ORIGINATORS OF INSTANTANEOUS LIQUID COOLING DEVICES

Table 1—Outside Conditions for Heating Estimates

State and City	Design Temp. F.	State and City	Design Temp. F.
ALABAMA		KANSAS	
Anniston	5	Atchison	-10
Birmingham	5	Concordia	-10
Gadsden	0	Dodge City	-10
Mobile	15	Leavenworth	-10
Montgomery	10	Salina	-15
Tuscaloosa	5	Topeka	-10
ARIZONA		Wichita	-5
Bisbee	15	KENTUCKY	
Flagstaff	-15	Bowling Green	0
Globe	20	Frankfort	0
Nogales	20	Hopkinsville	0
Phoenix	25	Lexington	0
Tucson	20	Louisville	0
Yuma	20	Owensboro	0
ARKANSAS		LOUISIANA	
Fort Smith	10	Alexandria	20
Hot Springs	5	Baton Rouge	20
Little Rock	5	New Orleans	25
Pine Bluff	10	Shreveport	15
Texarkana	10	MAINE	
CALIFORNIA		Bear Harbor	-15
Bakersfield	15	Belfast	-5
Fresno	25	Eastport	-10
Los Angeles	30	Lewiston	-15
Montague	0	Millinocket	-15
Pasadena	25	Orono	-20
Sacramento	25	Portland	-10
San Diego	35	Rumford	-20
San Francisco	35	MASSACHUSETTS	
San Jose	20	Amherst	-10
COLORADO		Boston	0
Boulder	-15	Clinton	-10
Colorado Springs	-25	Concord	-15
Denver	-20	Fall River	-10
Fort Collins	-30	Fitchburg	-10
Grand Junction	-15	Lawrence	-10
Pueblo	-25	New Bedford	-15
CONNECTICUT		Pittsfield	0
Bridgeport	-5	Plymouth	-5
Hartford	-5	Springfield	-10
New Haven	-5	Worcester	-10
New London	-5	Framingham	-10
Norwalk	-5	MARYLAND	
Torrington	-10	Annapolis	5
Watertown	-15	Baltimore	5
DELAWARE		Cambridge	5
Dover	5	Frederick	5
Milford	5	Frostburg	5
Wilmington	5	Salisbury	10
DISTRICT OF COLUMBIA		MICHIGAN	
Washington	0	Alpena	-10
FLORIDA		Ann Arbor	-5
Fort Myers	35	Big Rapids	-15
Gainesville	20	Calumet	-15
Jacksonville	25	Detroit	0
Key West	45	Flint	-10
Miami	35	Escanaba	-15
Orlando	35	Grand Rapids	-10
Pensacola	20	Kalamazoo	5
Tallahassee	25	Lansing	-10
Tampa	35	Ludington	-10
GEORGIA		Marquette	-10
Athens	10	Muskegon	0
Atlanta	10	Port Huron	-5
Augusta	15	Saginaw	-16
Columbus	10	Sault Ste. Marie	-20
Macon	15	MINNESOTA	
Rome	10	Alexandria	-25
Savannah	15	Duluth	-25
Way Cross	20	Minneapolis	-20
IDAH0		St. Cloud	-25
Boise	0	St. Paul	-20
Lewiston	5	MISOURI	
Pocatello	-5	Biloxi	15
Twin Falls	-10	Columbus	15
ILLINOIS		Hannibal	15
Aurora	-10	Jackson	15
Bloomington	-10	Meridian	10
Chicago	-10	Natchez	15
Danville	-5	Vicksburg	15
Decatur	-10	MISSOURI	
Elgin	-10	Columbia	-10
Joliet	-10	Hannibal	-10
Pearl	-10	Kansas City	-5
Rockford	-10	St. Louis	-5
Springfield	-10	St. Joseph	-10
INDIANA		Springfield	-10
Elkhart	-5	MONTANA	
Evansville	0	Anaconda	-15
Fort Wayne	-10	Billings	-25
Indianapolis	-5	Butte	-20
South Bend	-5	Great Falls	-20
Terre Haute	-5	Harve	-30
IOWA		Helena	-25
Burlington	-10	Miles City	-35
Cedar Rapids	-5	Missoula	-20
Clinton	-10	NEBRASKA	
Council Bluffs	-10	Grand Island	-20
Davenport	-10	Hastings	-25
Des Moines	-15	Lincoln	-10
Dubuque	-10	Lincoln	-10
Fort Dodge	-20	Norfolk	-15
Keokuk	-10	North Platte	-20
Marshalltown	-15	Omaha	-10
Sioux City	-20	York	-15
Waterloo	-15		

SAVE TIME

ON COMFORT COOLING AND REFRIGERATION INSTALLATIONS

Standardize on MINNEAPOLIS HONEYWELL CONTROLS FOR Every Job

WHEN you standardize on Minneapolis-Honeywell controls for refrigeration or air conditioning installations you benefit in many ways. First, you are using the finest controls available. Second, you or your dealers have to stock only one line of controls. Third, you reduce installation and service costs in the field because Minneapolis-Honeywell controls are easier to adjust and install. It will pay you to specify and install Minneapolis-Honeywell controls on every job. Dependable Minneapolis-Honeywell controls cost less than service . . . Minneapolis-Honeywell Regulator Co., 2807 Fourth Ave. South, Minneapolis, Minn. Branch and distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL

Control Systems

BROWN INSTRUMENTS FOR INDICATING, RECORDING AND CONTROLLING

Outside Design Dry Bulb Temperatures



Fig. 1—Outside design dry bulb temperatures in the United States for cooling estimates in air-conditioning work.

Outside Design Wet Bulb Temperatures

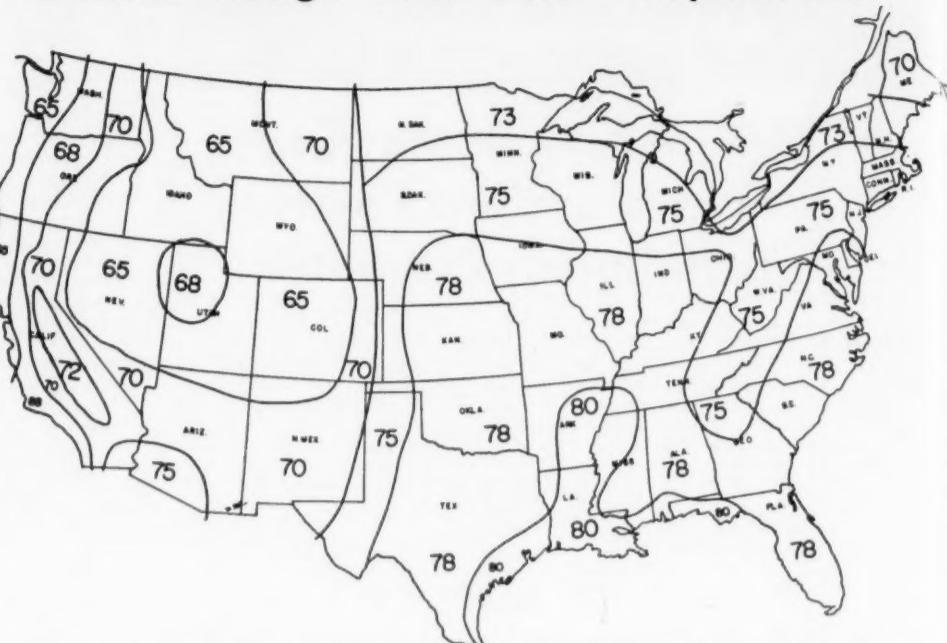


Fig. 2—Outside design wet bulb temperatures in the United States for cooling estimates in figuring air-conditioning work.

Table 4—Inside Design Conditions for Comfort Cooling

Outside Design Dry Bulb	Class AA Special Application Occupancy Over 40 Min.			Class A Average Application Occupancy Over 40 Min.			Class B Occupancy Under 40 Min.		
	Dry Bulb	Wet Bulb	R.H.%	Dry Bulb	Wet Bulb	R.H.%	Dry Bulb	Wet Bulb	R.H.%
85	73	64	64	74	64	60	75	64	57
	74	62	53	75	62	50	76	63	48
	75	61	45	76	61	43	77	61	41
	76	59	38	77	59	35	78	59	32
	75	66	65	77	67	62	78	68	60
	76	65	57	78	66	53	79	66	53
90	77	63	48	79	65	48	80	65	45
	78	62	41	80	63	40	81	64	40
	77	67	60	79	68	58	81	69	55
	78	66	54	80	67	51	82	68	49
	79	65	47	81	66	45	83	67	44
	80	64	42	82	65	40	84	66	38
95	78	69	65	80	69	58	82	70	57
	79	68	57	81	68	52	83	69	51
	80	66	50	82	66	44	84	68	45
	81	65	43	83	65	38	85	67	38
	79	69	63	81	70	58	83	71	57
	80	68	57	82	68	51	84	70	50
105	81	67	49	83	67	45	85	69	45
	82	66	43	84	66	39	86	68	40

NOTE: It is recognized that in certain unusual localities, the outside design dewpoint is substantially less than the dewpoint of the tabulated inside design conditions. In such cases, the code committee will entertain the recommendations by local authorities of the inside design conditions for use in those localities.

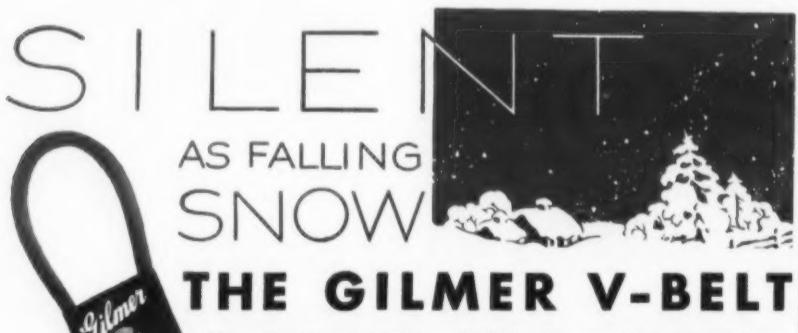
Table 5—Door Infiltration in Summer Commercial Establishments

Application	REVOLVING AND SWINGING DOORS OPENING TO OUTSIDE		
	Infiltration C.f.m. Per Person in Room 72-in. Revolving Door	36-in. Swinging Door	800 C.f.m.
Bank	6.5	8.0	
Barber Shop	4.0	5.0	
Broker's Office	5.5	7.0	
Candy and Soda	5.5	7.0	
Cigar Store	20.0	30.0	
Department Store (small)	6.5	8.0	
Dress Shop	2.0	2.5	
Drug Store	5.5	7.0	
Furrier	2.0	2.5	
Hospital Room	...	3.5	
Lunch Room	4.0	5.0	
Men's Shop	2.7	3.7	
Office (Private)	...	2.5	
Office (Professional)	...	3.5	
Restaurant	2.0	2.5	
Shoe Store	2.7	3.5	

WHEN DOORS ARE LEFT OPEN CONTINUOUSLY

72-in. Revolving Door (panels open) 1,200 C.f.m.
36-in. Swinging Door (standing open) 800 C.f.m.

NOTE: These values for swinging doors and for doors left open hold only where such doors are in one wall only, or where the doors in other walls are of the revolving type. If swinging doors are used for access, or doors are left open, in more than one wall, the infiltration cannot be estimated. The values for revolving doors hold regardless of number or location.



L. H. GILMER COMPANY, Tacony, Philadelphia
MAKERS OF THE WORLD'S BEST-KNOWN V-BELTS

ACMA Code Offers Standards Covering Heat Gain Factor

(Continued from Page 17, Column 3)

1. Heat loss (winter load)

a. Conduction through physical barriers, such as walls, doors, windows, floors, ceilings, etc.

b. Heat moisture required for incoming outdoor air.

1. Heat loss (summer load)

a. Conduction through physical barriers, such as walls, doors, windows, b. Heat from sunshine.

(1) Direct effect through glass areas exposed to the sun.

(2) Additional conduction through opaque barriers, such as walls, roofs, etc., exposed to the sun.

c. Heat and moisture introduced by incoming outdoor air.

d. Heat and moisture liberated by occupants.

e. Heat and moisture liberated by appliances, illumination, combustion, etc.

The basis of all these load values shall conform with the data in the current issue of the ASHVE Guide except where these standards give other specific requirements.

E. Design Outside Conditions

1. Heating

a. The design outside dry bulb temperature for calculating heating load shall be that minimum temperature which has been recorded on more than 2% of the days when heating is required. The local weather bureau information for the past 10 years shall be used as the authority for this record. For the purpose of this code, it is assumed that heating is required on any or all days when the average daily temperature is 65° F. or less.

For convenience, Table 1 of this Code gives approved temperatures to be used when local data is not available.

2. Cooling

a. The design outside conditions for cooling shall be the average for ten years of the highest dry and wet bulb temperatures remaining each year after excluding those higher temperatures which have occurred on only ten days of each year and for durations of less than three hours.

Figures 1 and 2 show maps of the United States, giving approximate design dry bulb and wet bulb temperatures which are approved for use until additional data is available. If the application of the above formula to authoritative weather records for an individual locality determines outside design conditions which differ from those given by the map, they will be approved instead.

These design outside conditions are considered to occur at 3 p.m.

F. Design Inside Conditions

1. Heating

a. The design inside dry bulb temperature shall be 70° F.

b. The design inside relative humidity shall be 35% with an outside temperature of 30° F.

2. Cooling

a. The design inside temperature and humidity shall be not more than that shown in Table 4.

NOTE: It is recognized that in certain unusual localities, the outside design dewpoint is substantially less than the dewpoint of the tabulated inside design conditions. In such cases, the committee will entertain the recommendations by local authorities of the inside design conditions for use in those localities.

G. Heat from Sunshine

(Basis of determination to be added later)

H. Design Outside Air Quantity

The total quantity of outside air used as a basis for design load calculations shall be the infiltration, or the air required for ventilation, whichever is greater. These shall be determined.

(Concluded on Page 19, Column 1)

LIFETIME COILS AND UNITS

CUSTOMIZED COILS:

SUR-E-FEX, HUM-E-FEX, LOUVR-E-FEX, AIR-E-FEX

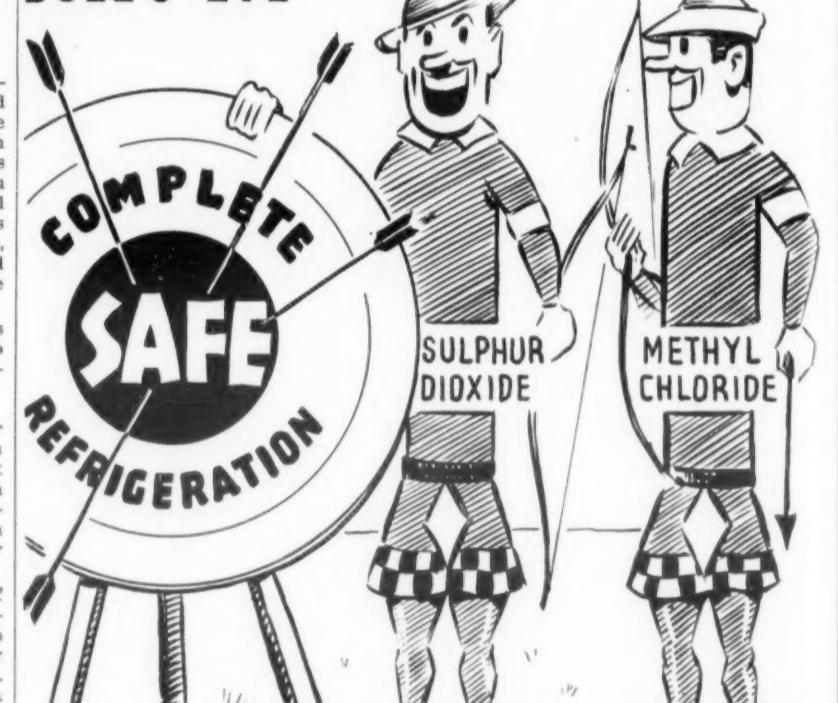
CUSTOMIZED UNITS:

FAN-E-FEX, (Standard and DeLuxe), TRANS-E-FEX, DRAFT-E-FEX, BLO-E-FEX, VERT-E-FEX For Refrigeration, BREEZ-E-FEX, COMF-E-FEX, SAN-E-FEX For Air Conditioning. Send for New Literature

REFRIGERATION APPLIANCES, INC., 1342 W. Lake Street, Chicago

The ANSUL Twins

HIT THE BULL'S EYE



ANSUL CHEMICAL COMPANY

MARINETTE » » » » WISCONSIN

Table 6—Infiltration Through Cracks Around Windows

Type of Window	Remarks	C.f.m./sp. ft. of Crack Wind Vel.		C.f.m./ft. of Entire Sash Area Wind Vel.	
		10 Miles Per Hr.	Double Window or Storm Sash	10 Miles Per Hr.	Single Window Small Large
Double Hung Wood Sash Windows (unlocked)	Average window not weatherstripped .....	.36	.28	.46	.29
	Poorly fitted window not weatherstripped .....	.27	.20	.34	.22
Double Hung Metal Windows	Poorly fitted window weatherstripped	1.16	.85	1.50	.93
	Non-weatherstripped (unlocked) .....	.33	.27	.42	.27
Single Sash Metal Windows	Weatherstripped (unlocked) .....	.78	.60	1.00	.62
	Hollow metal (vertically pivoted) .....	.33	.27	.42	.27
	Residential casement	1.75	1.48		
		.55	.40		

Infiltration through door cracks may be assumed to be twice that of window cracks. Small windows are approximately 30x72 in. large windows are approximately 54x96 in.

Applications Code Describes Factors Which Must Be Considered in Estimating Equipment for Air Conditioning

(Concluded from Page 18, Column 5) defined as outlined in paragraphs I and J below.

I. Infiltration

1. Heating
Infiltration rates for calculating loads shall be determined in accordance with the latest edition of the ASHVE Guide.

2. Cooling

a. Infiltration rates for calculating summer cooling loads shall not be less than that indicated from Tables 5 and 6.

NOTE: These values for swinging doors and for doors left open hold only where such doors are in one wall only, or where the doors in other walls are of the revolving type. If swinging doors used for access, or doors are left open, in more than one wall, the infiltration cannot be estimated. The values for revolving doors hold regardless of number or location.

To determine the total CFM infiltration due to opening of doors, multiply the design number of occupants by the factor from the above table for the kind of establishment in question. When there is more than one door, treat them as though there were only one, except in case of open doors.

J. Ventilation Requirements

1. In no case shall ventilation be less than that required by any local ordinance.

2. For summer cooling, the ventilation per stated occupant shall be not less than that shown in Table 7.

K. Design Occupancy

1. The design load calculations shall be based on the stated occupancy of the building during the time of maximum design conditions.

2. The heat given off by each occupant shall be calculated as not less than that in Table 8.

L. Heat from Appliances

(A table is to be included later)

M. Transmission Coefficients

Heat conduction shall be based on transmission coefficient for physical barriers such as walls, doors, windows, ceilings, floors, as given by the 1932 Edition of ASHVE Guide.

N. Total Air Circulation

The total air circulation is not specified. It shall be determined by the heating and cooling load and the type and arrangement of supply openings. It shall be adequate to meet the requirements under O.

O. Air Distribution

1. The quantity and temperature of the treated air and the method of introducing it to the conditioned space shall be designed to limit to 3° or less, the variation in dry bulb temperature at the same level throughout that portion of a single room that

is normally frequented by persons.

2. It is desirable to avoid air velocities exceeding 50 lineal feet per minute in the zone between the floor and the five foot level, in spaces normally frequented by persons who are not normally moving about. Exceptions must be made of the vicinity of a supply or return grille when construction necessity requires it to be located below the 5 ft. level and in a space normally frequented by occupants.

P. Duct Capacity
It is desirable that return ducts be sized large enough to handle 100% of the circulated air to permit economical heating and cooling prior to occupancy.

It is desirable that the outside air duct be large enough to handle 100% of the total circulated air to permit economical operation during mild weather, but in every case it shall be large enough to admit 50% more air than that determined from the preferred value in Table 7.

Q. Capacity Specifications

The air conditioning equipment shall have a capacity equal to the design load defined in Paragraph D under the following conditions:

1. Cooling

- a. Design outside conditions defined in Sec. E-2.
- b. Design inside conditions defined in Sec. F-2.
- c. Design air quantity defined in Sec. G.
- d. Design occupancy defined in Sec. J.
- e. Condensing medium for refrigeration equipment.

(1) Water cooled refrigeration equipment.

(a) City water temperature not less than the average maximum value for the months of July and August. (ASHVE Guide)

(b) Well water temperature not less than the average maximum value for the months of July and August.

(c) Cooling Tower—The Tower shall deliver water not more than 10° above the design wet bulb temperature.

(2) Air cooled refrigeration equipment. The condenser air temperature shall be not less than the design dry bulb. Allowance should be made for temperature rise above ambient for an air cooled condensing unit installed in a room, its amount depending on the unit size, room volume and rate of ventilation.

(3) Refrigeration equipment with Evaporative Condenser cooling. The condenser shall be selected for a wet bulb temperature not less than the design wet bulb. Allowance should be made for temperature rise above ambient for an Evaporative Condenser installed in a room, its amount depending on the unit size, room volume and rate of ventilation.

2. Heating

- a. Design outside conditions as defined in Sec. E-1.
- b. Design inside conditions as defined in Sec. F-1.
- c. Design outside air quantity as

defined in Sec. H-1.

d. Heating medium at a temperature that can be maintained by the heat generating device when delivering heat to the heating device at a rate not less than the design heating load.

R. Noise

1. The sound level meter specified by the American Standards Association's Committee on Sound, shall be used for noise readings. Noise values to be given in terms of db. based on the 40 db. weighted network.

2. Where noise specifications are made they shall specify the room

noise level due to the operation of the apparatus corrected to the noise level of the room when the apparatus is not in operation.

3. Noise readings in the conditioned space shall be taken.

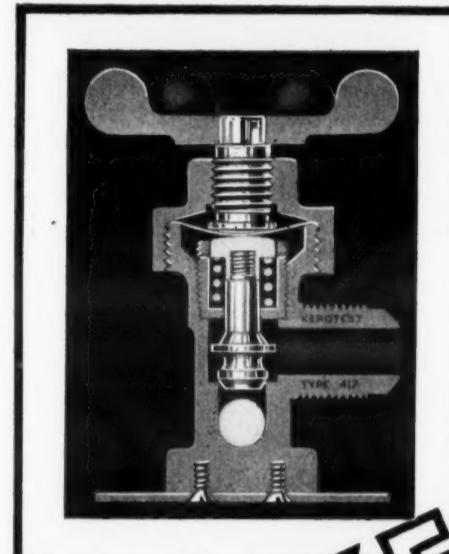
a. In the case of apparatus located within the room, at a height of five feet and at a distance of five feet from the apparatus.

b. In the case of air inlet or outlet openings, at a height of five feet and in front of the opening at a horizontal distance of five feet and in front of the opening at a horizontal distance of five feet from the wall in which the opening is located.

Trane Markets 'Airite' for Year-'Round Conditioning

LA CROSSE, Wis.—Trane Co. recently introduced "The Airite," a year-round air conditioner of the direct-fired, oil-burning type for residential heating and air conditioning.

In the winter, this unit is designed to give automatically controlled heat, and in the summer, cooling is accomplished by standard Trane cooling coils using either cold water or direct expansion of refrigerants, the manufacturers say. The cabinet has a two-tone finish.

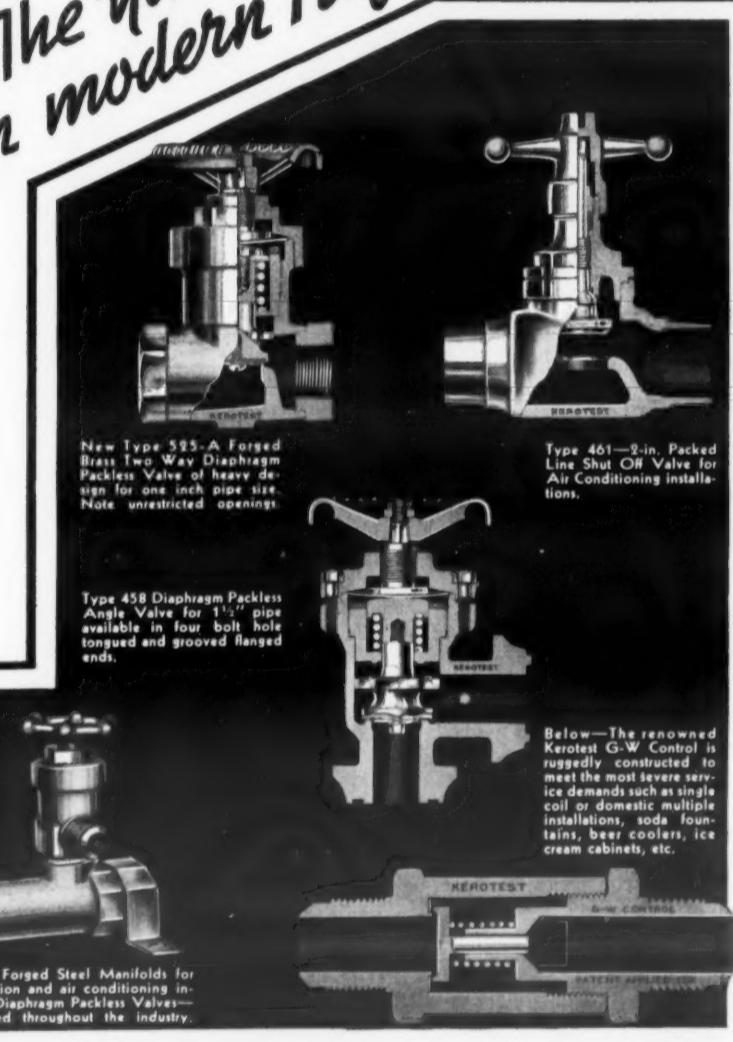


Quality goes through and through in the design and construction of Kerotest Diaphragm Packless Valves. Note the compactness, the full unrestricted openings and the pressure tested metal-to-metal backseat when the reciprocating stem is in the open position.

KEROTEST
DIAPHRAGM PACKLESS VALVES
*The yardstick of value
in modern Refrigeration*

Measure Kerotest Diaphragm Valves from every angle and you will appreciate why they set the pace in design... in construction... and in actual service. Forged construction gives them extraordinary strength and minimum dimensions... the multiple diaphragm design makes Kerotest the only valves that can be repaired under full pressure while the valve action is quick, positive and dependable at all times.

Kerotest Diaphragm Packless Valves of extra heavy body construction have withstood pressure tests by the Underwriters Laboratories to 11,250 pounds in full open, half open and closed positions... also durability tested to 50,000 cycles open and closed,—a test that has established Kerotest dependability throughout the industry.



KEROTEST MANUFACTURING CO.
PITTSBURGH, PA.

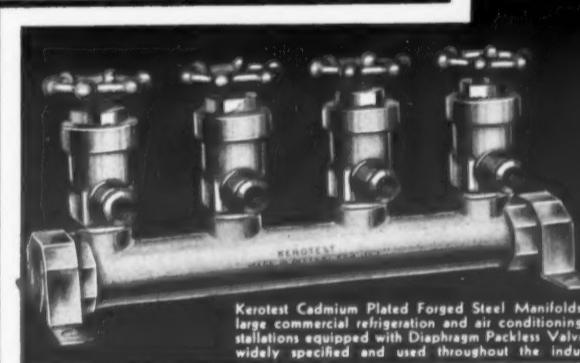
PIZZIURGH, PA.

New Type 525 Two Way Diaphragm Packless Valve of heavy design for one inch pipe size. Note unrestricted openings.

Type 461—2-in. Packed Line Shut Off Valve for Air Conditioning installations.

Type 458 Diaphragm Packless Angle Valve for 1½" pipe available in four bolt hole tongued and grooved flanged ends.

Below—The renowned Kerotest G-W Control is ruggedly constructed to meet the most severe service demands such as single coil or domestic multiple installations, soda fountains, beer coolers, ice cream cabinets, etc.



Kerotest Cadmium Plated Forged Steel Manifolds for large commercial refrigeration and air conditioning installations equipped with Diaphragm Packless Valves—widely specified and used throughout the industry.

Jobbers with Local Stocks

Albany, N. Y.	Hey & Co.
Allentown, Pa.	General Refrigeration Supply Co.
Atlanta, Ga.	J. M. Tull Metal & Supply Co., Ltd.
Baltimore, Md.	Cleenden Bros., Inc.
Baltimore, Md.	Melchior, Armstrong, Dessau Co.
Boston, Mass.	A. E. Borden Co.
Bridgeton, Conn.	Parsons Bros.
Brooklyn, N. Y.	Coleman Electrical Supply Co., Inc.
Buffalo, N. Y.	Root, Neal & Co.
Cambridge, Mass.	Melchior, Armstrong, Dessau Co.
Chicago, Ill.	H. W. Blythe Co.
Chicago, Ill.	Max A. R. Matthews
Chicago, Ill.	Borg-Warner Service Parts Co.
Chicago, Ill.	Refrigeration Equip. & Supply Co.
Chicago, Ill.	Fred C. Kramer Co.
Cincinnati, Ohio.	The Meek Bros. Co.
Cleveland, Ohio.	Williams & Co., Inc.
Columbus, Ohio.	Williams & Co., Inc.
Dallas, Texas.	The Electro-motive Co.
Davenport, Iowa.	Republic Electric Co.
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Des Moines, Iowa.	C. L. Perreval Co.
Detroit, Mich.	J. M. Oberle, Inc.
El Paso, Texas.	Zork Hardware Co.
Fargo, N. D.	Fargo Foundry Co.
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Greensboro, N. C.	Home Appliance Service Co.
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Service Methods

Wile Clarifies Explanation of Operation Of Thermostatic Expansion Valve; Describes Test Method

By D. D. Wile, Chief Engineer,
Refrigeration and Air Conditioning, Detroit Lubricator Co.

RECENTLY a very capable refrigeration service man told us that he thought the most serious trouble with thermostatic expansion valves was caused by too much mystery surrounding their operation. He compared it to radio service, because in the old days when a radio set went wrong it was customary to first change the tubes because there wasn't any easy means to test if the tubes were good or bad. He went on to explain that nowadays every radio repair man has a simple test outfit which tells with little effort just exactly what is wrong with the tube or if it is in good condition. He thought that much could be accomplished in refrigeration by a device to test thermostatic expansion valves which would tell exactly what was wrong.

This fellow said that he would gladly pay \$10 or more for a simple device that could test thermostatic valves. In this article we are going to describe just such a test device and it will cost much less than \$10, probably less than \$1.

In addition we are going to try to take the mystery out of the operation of thermostatic expansion valves so that their operation will be better understood. It is surprising what a large percentage of valves come back to the factory with absolutely nothing wrong.

In order to understand how the valve operates, it would be well to first consider just what happens to the refrigerant in the evaporator. The performance of the evaporator and the valve are so closely related that it is important to thoroughly understand just what happens in the evaporator.

Operation of Evaporator

In a refrigeration system, the refrigerant may exist in several different states. In the liquid line, we have solid liquid, but in passing through the expansion valve this liquid expands into a mixture of liquid and vapor.

As this mixture passes through the evaporator coil, it absorbs heat and more of the liquid is boiled into a vapor. The temperature of this mixture is the same either at the beginning or end of the evaporator, but the amount of liquid becomes less as it works its way through the coil.

When you feel the temperature of a suction line with your hand and compare it to the temperature of the evaporator you are really estimating the superheat.

The thermostatic expansion valve has a feeler bulb which is attached to the suction line at the evaporator so that it can control superheat at that point. By controlling the superheat accurately, the thermostatic valve keeps the entire coil working at maximum efficiency without allowing liquid refrigerant to enter the suction line.

Operation of the Thermostatic Valve

Referring to Fig. 1, liquid refrigerant enters at P and passes through the strainer N to the orifice T. The needle S is attached to a yoke member which is rigidly attached to the bellows K on the valve body.

When pressure in the body increases it actuates the body bellows and it pulls the needle onto the seat. A decrease in pressure in the body tends to open the needle.

The power element F contains a bellows which is attached by means of a capillary tube to the feeler bulb M. This feeler bulb is charged with refrigerant and therefore the pressure exerted on the power element bellows works against the body bellows through the push rod V so that an increase in temperature of the feeler bulb tends to open the needle. Since the pressure in the valve body is determined by the evaporating temperature, the operation of the valve is controlled by the difference between feeler bulb temperature and evaporating temperature, or in other words, superheat.

Maintains Constant Superheat

The valve is adjusted at the factory for 10° superheat and is designed to maintain this adjustment accurately regardless of whether it is installed on high temperature or low temperature applications. This uniformity is accomplished by making the body bellows slightly larger in diameter than the power element bellows.

This produces a compensating effect that insures uniform operation throughout the entire operating range.

Many years' experience has shown that most commercial applications work best with the thermostatic valve adjusted for approximately 10° superheat. Low temperature jobs such as ice cream cabinets, medium

Fig. 1—Diagram of Simple Freon System

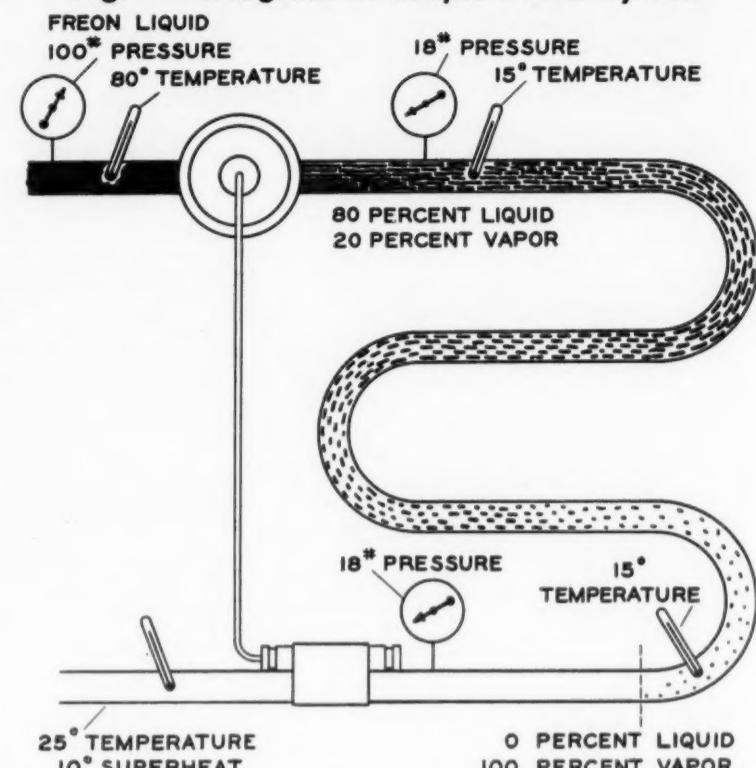


Fig. 1 shows the way liquid refrigerant turns into vapor and also that the temperature of the liquid is the same in any part of the coil until it is vaporized.

temperature jobs such as commercial installations, and even high temperature air-conditioning jobs, all work most efficiently in the majority of cases when adjusted for 10° superheat.

By building the valve to maintain this superheat accurately as shown in Fig. 4, it becomes unnecessary to adjust it for every different type of job. Experience has shown that when the job is properly installed it is seldom necessary to change the factory setting.

By perfecting the design of the valve so that it does not need to be readjusted, it becomes possible to seal the adjustment at the factory so as to make the valve non-adjustable. Fig. 4 shows the No. 674 Detroit non-adjustable valve which is widely used on factory assembled units. This

valve operates on the same principle as the No. 673 valve except that the adjustment is sealed on the inside of the valve.

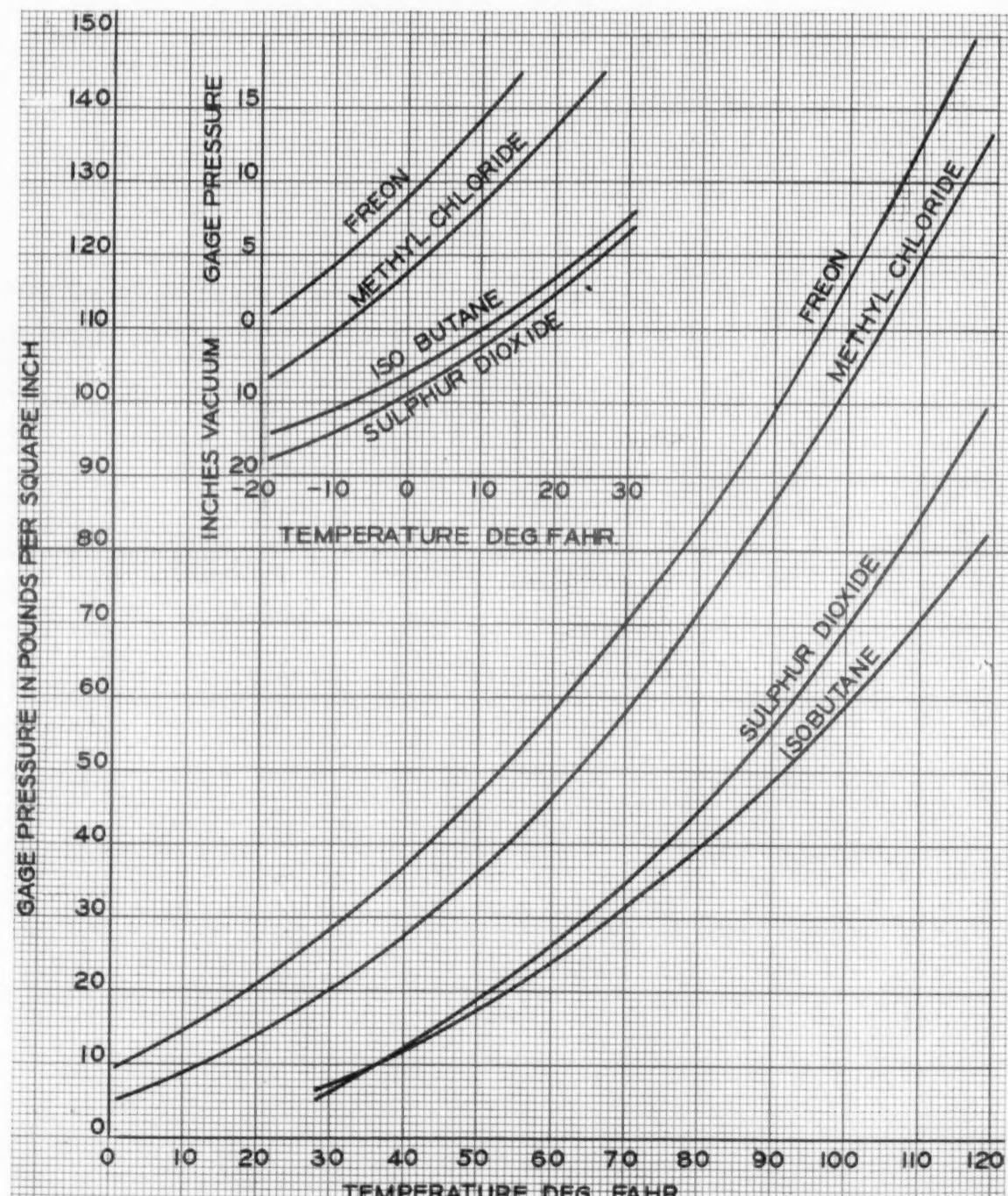
Positive Closing

Making the body bellows larger than the power element bellows also insures that the valve closes off tight during the shut down period. When pressure builds up in the valve body, it exerts a greater force than the power element bellows due to the slightly larger diameter, and this force assisted by the springs insures tight closing of the needle.

During the shut-down period when the evaporator warms up and tends to close the needle, the feeler bulb also warms up and tends to open the needle, but the body bellows being

(Concluded on Page 21, Column 1)

Fig. 2—Pressure-Temperature Chart for Common Refrigerants



Let our experts solve
your problems

For information, for advice, for help in solving any problem about refrigeration servicing or refrigeration installation—call upon our technical department. Chemists, engineers, practical trained technicians are at your service—without cost or obligation. Write to F. A. Eustis, Sec'y., Virginia Smelting Co., 131 State St., Boston, Mass.

V-METH-L (Virginia Methyl chloride) and Extra Dry ESOTOO (liquid sulphur dioxide) shipped promptly from 69 distributing points.



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WEST NORFOLK, VIRGINIA

Method of Testing Expansion Valves

(Concluded from Page 20, Column 5) slightly larger than the power element bellows produces a greater force with the result that the higher the pressure goes the tighter the needle seats.

Opens When Machine Starts

When the compressor starts there is always a reduction in the suction pressure which takes place quickly. By referring to Fig. 3, it will be seen that a reduction in pressure in the valve body tends to open the needle. This is just what happens at the start of the cycle.

Then after the needle opens the feeler bulb controls the superheat on the suction line so as to maintain the coil completely refrigerated.

At the end of the cycle when the machine stops, there is always a slight increase in pressure which occurs almost instantly and this increased pressure acts on the body bellows to close the needle. Then as the pressure slowly builds up during the off cycle, the needle remains tightly closed as explained previously.

Materials of Construction

When moisture is present in a refrigeration system it always causes a corrosive condition. This is true of all common refrigerants. Dryers, unless properly selected, may exaggerate the corrosive effect. The materials used in the expansion valve must, therefore, be capable of withstanding these corrosive conditions.

The needle and seat may be subject to severe corrosion and wear conditions. Any ordinary material, including stainless steel, breaks down quickly and allows the valve to leak.

Detroit valves contain needles and seats of a special alloy developed for this particular purpose. This alloy is named Delubaloy and years of experience have proven its ability to give long service without leaking. The construction of the needle provides a perfect swivel action which eliminates wear and insures long life.

The bellows must be capable of withstanding corrosion and mechanical flexing and here again ordinary materials may give trouble. Recently a new metal has been adopted known as Duraflex and extensive tests have proven its ability to withstand severe corrosion and yet have a mechanical life of millions of cycles or the equivalent of many years service.

Gas Charged Power Element

When starting up a warm refrigerating system, the suction pressure

'Pull-Down' Chart

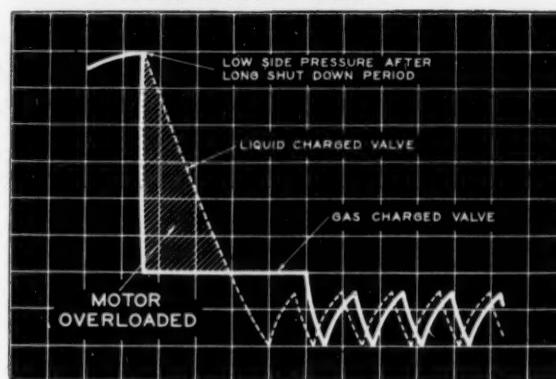
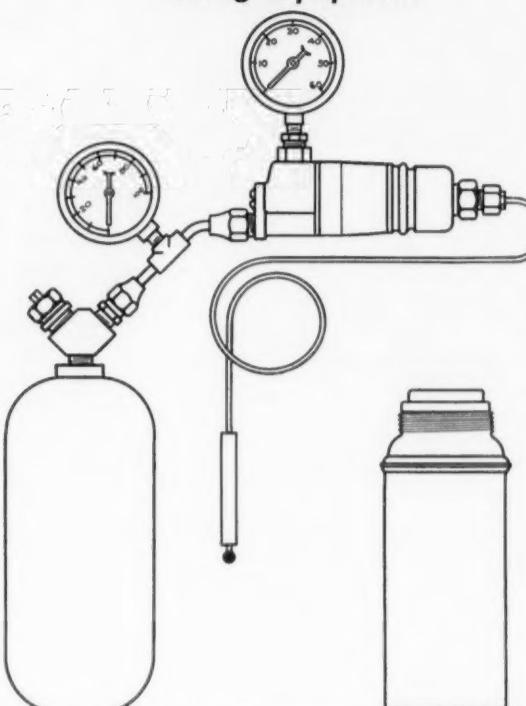


Fig. 5 (above)—This chart shows the comparative performance of gas charged and liquid charged valves during "pull-down."

Fig. 6 (right)—The equipment needed to test performance of thermostatic expansion valves.

Testing Equipment



it is a sign that the power element is dead.

Note: With the new gas charged expansion valves, the amount of charge in the power element is limited and the pressure will not build up above the specified pressure. This pressure is always marked on the power element and must be considered when testing gas charged valves.

8. With high pressure showing on both gauges as outlined in the preceding paragraph, the valve can be tested to determine if the body bellows leaks. This should be done by loosening up the packing nut and using a Halide leak detector or soap suds to detect the escape of gas. When making this test it is important that the gauge and other fittings are screwed up tight so as to eliminate leakage at other points.

Precautions

1. Be sure that the service drum has liquid in it and is warm enough to build up sufficient pressure. The high pressure gauge used as shown in the diagram will often save a lot of trouble because it will show when there is not enough pressure on the inlet side of the valve. During the winter time especially the service drum may become cold and develop insufficient pressure to make a satisfactory test.

2. Be sure that the thermos bottle or other container is full of finely crushed ice and does not have merely a little ice floating in the water.

**FILTRINE
WATER COOLERS**
STORAGE • SHELL & TUBE
BROOKLYN, N. Y.

rapidly until it equals the inlet pressure.

By using a low pressure gas charge, the suction pressure pulls down quickly to a safe limit and the machine runs at this safe pressure until the unit is partially cooled. This operation is shown in Fig. 5.

As soon as the unit is partially cooled and the feeler bulb becomes cooled, a small amount of the gas charge condenses into liquid and then the valve controls the superheat of the suction line so as to maintain the evaporator completely refrigerated and operating at maximum efficiency.

How to Test

It is quite a simple matter to make a complete and accurate test of these valves in the field. In most cases the regular service kit contains all of the necessary equipment. The equipment required is as follows:

1. Service drum full of Freon or methyl chloride (in the shop a supply of clean dry air at 75 to 100 lbs. pressure can be used in place of the service drum). The service drum is merely for the purpose of supplying pressure and for this reason the refrigerant used does not have to conform with the valve being tested; in other words, a drum of Freon would be perfectly satisfactory for testing with SO_2 , methyl chloride, or Freon values.

2. A high pressure and low pressure gauge. The low pressure gauge should be accurate and should be in good condition so that the pointer does not have too much lost motion. The high pressure gauge is not absolutely necessary but is recommended so as to show the pressure on the inlet of the valve.

3. Fittings and connections are required to complete the hook up as shown in Fig. 6.

4. Some finely crushed ice is necessary and one of the most convenient ways of carrying this around is to keep it in a thermos bottle. Otherwise a milk bottle or other container is satisfactory. Whatever the container is, it should be completely filled with crushed ice. Do not attempt to make this test with the container full of water and a little crushed ice floating around on top.

Procedure

1. Connect the valve up as shown with the low pressure gauge screwed loosely into the adapter on the expansion valve outlet. The gauge is screwed up loosely so as to provide a small amount of leakage through the threads.

2. Insert the bulb in the crushed ice.

3. Open the valve on the service drum and be sure that the drum is warm enough to build up a pressure of at least 70 lbs. on the high pressure gauge connected in the line to the valve inlet.

4. The expansion valve can now be adjusted. The pressure on the outlet gauge should be different for various refrigerants as follows:

Freon 22 lbs.
Methyl chloride 15 lbs.
Sulphur dioxide 3 lbs.

Be sure to have a small amount of leakage through the gauge connection while making this adjustment.

5. Tap the body of the valve lightly with a small wrench in order to determine if the valve is smooth in operation. The needle of the gauge should not jump more than 1 lb.

6. Now screw the gauge up tight so as to stop the leakage through the threads and determine if the expansion valve closes off tightly. With a good valve, the pressure will increase a few pounds and then either stop or build up very slowly. With a leaking valve the pressure will build up

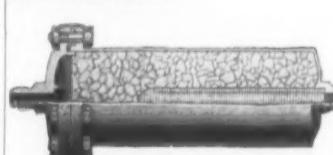
WIDE MARGIN OF STRENGTH
MANHATTAN
V-BELTS

Maximum strength and flexibility . . . Assured by original Manhattan construction—endless whipcord strength section fully floated in rubber and placed in the neutral axis area. Pretreated to minimize all inelastic stretch. Smoother operation—noise eliminated. One trial and you will always specify Manhattan.

THE MANHATTAN RUBBER MFG. DIVISION
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VALVES



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Detroit Thermostatic Expansion Valves

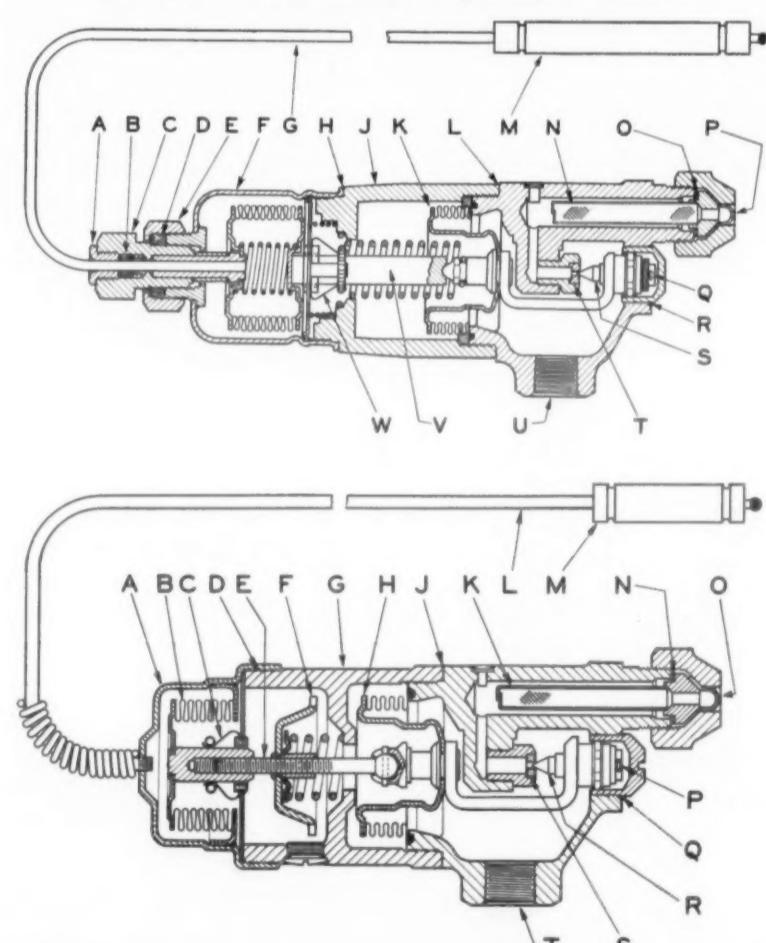


Fig. 3 (above) shows a No. 673 expansion valve and Fig. 4 (below) a No. 674 expansion valve. The key for both is:

A—Packing nut	H—Sealed joint
B—Spring loaded packing around capillary tube	J—Bakelite extension
C—Adjusting nut	K—Body bellows
D—Packing around adjusting screw	L—Sealed joint
E—Packing nut	M—Feeler bulb
F—Power element	N—Inlet strainer
G—Capillary tube	O—Strainer gasket
	P—Inlet connection
	Q—Needle swivel
	R—Plug hermetically sealed
	S—Delubaloy needle
	T—Delubaloy seat
	U—Outlet connection
	V—Push rod
	W—Anti-chatter device
	X—Power element bellows
	Y—Factory adjustment
	Z—(674)

Service Methods

Ways to Clean Service Cylinders for Storage Of Methyl Chloride Given by McGovern

By E. W. McGovern, R. & H. Chemicals Department, E. I. Du Pont de Nemours & Co., Inc.

IN transferring methyl chloride and other refrigerants* from larger containers to the smaller service sizes, clean cylinders should be used. Cylinders used only for holding pure refrigerant may easily be kept clean if they are never discharged down to atmospheric pressure.

Further, a clean cylinder should not be attached to a liquid line of a refrigerating machine since a refrigerant contaminated with oil and dirt may back into the cylinder if the pressure in the latter is lower than in the liquid line of the machine. Cylinders used to receive refrigerant from machine should be kept separate and identified by a suitable paint marking.

Refrigerant withdrawn from machines is invariably contaminated with oil and may also contain moisture, acid, metal chips and other foreign materials. Oil in itself is not harmful, if it is good oil, put its presence in a cylinder indicates the probable presence of harmful contaminants.

Cylinders May Rust if Open

Cylinders used only for pure refrigerant may rust if they have been discharged and the valves left open, permitting moisture-laden air to enter.

In cleaning a contaminated cylinder, oil, dirt, etc. must be removed, and the container thoroughly dried. The methods depend upon the facilities available. The various methods are listed here in the order of preference. Comments and procedures apply to refrigerants in general as well as to methyl chloride although precautions to avoid the presence of moisture are especially necessary in the case of sulphur dioxide.

Before proceeding with the cleaning, discharge the contents from the inverted cylinder with the valve open wide. Care should be taken that the discharge opening is not pointing toward anyone, and that the gas is released to the outside air. Next, the valve should be removed, overhauled, cleaned, and repaired if necessary.

Replace Fusible Plugs

Any fusible plugs should be replaced temporarily by plugs or corks, since the 158° F. melting point of the fusible metal is likely to be reached in treating the cylinders with steam or hot air.

If in doubt as to whether or not the cylinder needs cleaning, examine the interior with the aid of a small electric bulb or pencil-type flashlight lowered into the cylinder; but residual gas should first be thoroughly flushed out with clean dry air.

If the cylinder and valve are in satisfactory condition, replace the valve and fusible plug immediately.

* Transfer methods were described in an article by E. W. McGovern, in the Oct. 2, 1935 issue of Electric Refrigeration News.

INFORMAL TALK NUMBER 54

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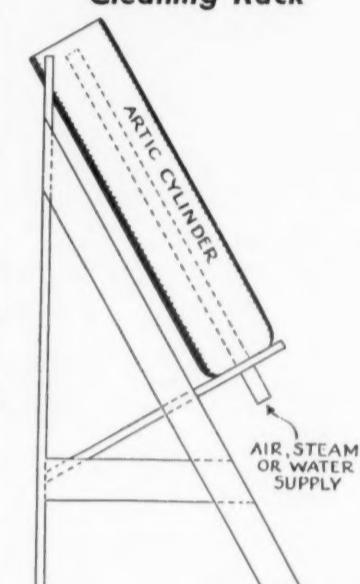
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and, if vacuum is available, evacuate the cylinder. If the container is not clean and dry, use one of the following procedures:

Soap Wash and Steaming Method

1. Place a soap solution and steel balls in the cylinder and put corks in the valve and fusible plug openings. Soap solution may be made up in the proportion of 1 oz. soap powder to 3 quarts of water. A pint and a half of soap solution and 6 lbs. of approximately $\frac{1}{4}$ inch steel balls are sufficient for a 6 lb. methyl chloride cylinder. Steel balls are not necessary unless

Cleaning Rack



The sketch shows the rack used for cleaning methyl chloride cylinders.

there is rust or scale to be removed.

2. Roll or shake the cylinder for five minutes. Tapping cylinder while rolling will help to loosen scale or adherent dirt if steel balls are not available.

3. Invert the cylinder, placing it on a rack if one is available. Place bucket underneath to catch steel balls and soap solution on removal of cork. Be sure all balls are out.

4. Rinse the cylinder with clean water, using a hose and small pipe or copper tubing extension to reach up to the bottom of the inverted cylinder.

5. Steam the inverted cylinder until hot, using hose and pipe or tubing extension.

Method of Drying Cylinder

6. Blow the steam out of the cylinder with clean, dry air. The air may be dried by means of Activated Alumina, Calcium Chloride or Quick Lime (Calcium Oxide) in conjunction with a suitable filter, e.g., of fine canvas, to prevent blowing particles of the drying agent into the cylinder. Less dry air is required if it is hot.

(a) If steam and/or a sufficient supply of dry air is not available, cylinders may be dried by rinsing out with Methanol (Methyl Alcohol) to remove most of the water. A minimum of dry air is then required to remove the Methanol and remaining traces of water.

(b) Another alternative, in case steam and/or dry air is not available, is simply to blow out the wet cylinder (after step 4) with hot air until the cylinder is dry. It is helpful to steam the cylinder first, as in step 5, if steam is available. Air may be heated in a gas-fired or steam-jacketed pipe. However, heating air does not dry it but on the contrary increases its capacity to hold water, and this method leaves the cylinder full of air containing more or less moisture which may under some circumstances, especially in the case of sulphur dioxide, be enough to be harmful.

7. Immediately replace the valve and safety plug in the cylinder. (Litharge and Glycerine dope should first be applied sparingly to the valve and plug threads.) If it is desired to inspect for cleanliness before replacing the valve, examine immediately by the aid of a small light bulb. The cylinder should be clean, dry and free from loose or loosely-adhering scale. Replace the valve and safety plug

as soon as possible to avoid entrance of moist air into the cylinder.

8. If vacuum is available, evacuate cylinder, preferably to not less than 28 inches of mercury. This insures dryness and aids in cylinder filling. Removal of water is even more effective if the cylinder is hot when evacuated. Evacuation is not absolutely necessary if steps 6 and 7 are carefully carried out to eliminate moisture.

Chlorinated Solvent Wash Method

The chlorinated hydrocarbons, trichlorethylene and carbon tetrachloride, etc., are strong solvents for oil and grease and may be used in place of the soap wash and steaming. Care should be taken in using carbon tetrachloride, for this solvent breaks down in the presence of moisture and iron, and, if the cylinder is allowed to stand before thorough drying, rust may result. It is safer to employ the non-corrosive solvent, Trichlorethylene. Both are rather expensive unless a reclaim still is available. These solvents are convenient to use, but for water-soluble impurities such as soaps, dirty water, acid, etc., soap solutions are much more efficient.

1. Place trichlorethylene or carbon tetrachloride and, if available, steel balls in the cylinder. About one quart of solvent for a 6 lb. cylinder should be used although less may suffice for a comparatively clean cylinder.

2. Roll or shake cylinder for five minutes. If steel balls are not used, tapping cylinder will aid removal of scale and dirt.

3. Remove the solvent and steel balls.

Rinsing Cylinders

4. Rinse with about one pint of clean solvent. Repeat rinse if necessary. This comparatively clean rinse solvent can be used again for the initial wash of cylinders. If the inside of the cylinder is wet with water, this may protect some of the oil and grease from the action of the solvent. In this case, the cylinder should be rinsed with about one pint of Methanol (Methyl Alcohol) after the first solvent wash. The Methanol, being a solvent for water, will effect the removal of most of the water so that the remaining oil and grease can be removed by the solvent rinse.

5. Dry the cylinder by blowing out with dry air as in step 6 of "Soap Wash and Steaming Method." Vacuum should also be used, if available, as in step 7.

Flushing with Refrigerant

As an added precaution, a cylinder may be flushed out with pure liquid refrigerant. This applies to cylinders that have been cleaned and dried as described here, as well as to cylinders that are already sufficiently clean and dry as not to require intensive cleaning.

The cylinder is connected to the stock cylinder and refrigerant introduced—about $\frac{1}{4}$ lbs. of methyl chloride to a 6 lb. cylinder. The small cylinder is then disconnected and rolled for a few minutes. The refrigerant is next allowed to escape from the inverted cylinder after which the valve should be closed immediately.

In the case of sulphur dioxide cylinders, a very small quantity of moisture may do considerable harm. Flushing is necessary and two flushings are often used.

Flushing removes more or less moisture depending upon the solubility of water, which in the case of methyl chloride is only about 0.2% by weight. Methyl chloride is similar in solvent action to carbon tetrachloride and trichlorethylene, and dissolves oils and grease. Blowing liquid refrigerant from the inverted cylinder tends to remove solid particles small enough to pass through the valve.

Test for Cleanliness

Evaporation in a clean dry flask of a sample of liquid methyl chloride run from an inverted cylinder will indicate whether or not the cylinder and refrigerant are clean. Oil, dirt or ice crystals should not show up in this test.

Service men should not heat containers to high temperatures to remove moisture and burn out impurities such as oil, although certain types of cylinders can be so treated under factory-controlled conditions. The strongest objection to this treatment is that the internal structure of the steel may be so damaged as to weaken the cylinder seriously. Paragraph 422 of the Interstate Commerce Regulations, Bureau of Explosives Pamphlet No. 9, reads as follows:

"Cylinders which have been in a fire must not again be placed in service until they have been properly heat-treated and retested as prescribed in paragraph 423: Provided, that cylinders made of plain carbon steel with not over 0.25% carbon need not be heat-treated, and also Acetylene cylinders need not be heat-treated if examination shows the porous filling to be unchanged and intact, and they may be used after passing the pressure test prescribed therefor."

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Dayton Refrigerators Are Conventional Type with 3 Shut-Off Valves and Flooded Evaporator

By K. M. Newcum

Editor's Note: The following article, covering service operations on the Dayton household electric refrigerator manufactured by Heinz & Munschauer of Buffalo, N. Y., is the second in the series of instructions on various makes and models.

These articles are prepared by K. M. Newcum, author of the **MASTER SERVICE MANUAL**, and explains the general methods of servicing certain models of a particular make of electric refrigerator.

Since the systems used in practically all makes of household electric refrigerators are of one of the general types described in the **MASTER SERVICE MANUAL**, Mr. Newcum simplifies the problem of describing the service complaints and service operations by referring the reader to those parts of the **MASTER SERVICE MANUAL** which cover the problems and methods for the type of system involved.

The Dayton refrigerator, manufactured by Heinz & Munschauer, Buffalo, N. Y., is of the conventional type employing a single-cylinder reciprocating compressor with the three standard shut-off service valves, and the flooded evaporator using the low side float valve, and the two standard evaporator shut-off service valves.

Temperature control is by Ranco thermostat. Sulphur dioxide is the refrigerant used in all Dayton models.

As this system is conventional in all respects and uses the low side float along with the thermostatic control it is classed as type "1C" system described in the **MASTER SERVICE MANUAL** and all service complaints and operations on the Dayton may be found under type "1C," given in Chapter 9 of the **MASTER SERVICE MANUAL**, pages 207-210.

Fig. 1 shows the Dayton refrigeration system cycle of operation.

Fig. 2 illustrates the cooling unit

restricted to .0035 in. for quietness.

Under normal operation, when only the refrigerant gas, or gas and a very small amount of oil is passing the discharge valve this .0035 in. lift is sufficient. If, however, a slug of oil or liquid refrigerant is forced through, the valve cage and cage spring lift to allow for increased passage.

The discharge valve seat is flush with the top of the valve plate and may be lapped on a piece of plate glass or honed with a perfectly flat oil stone to remove any irregularities

Compressor Body

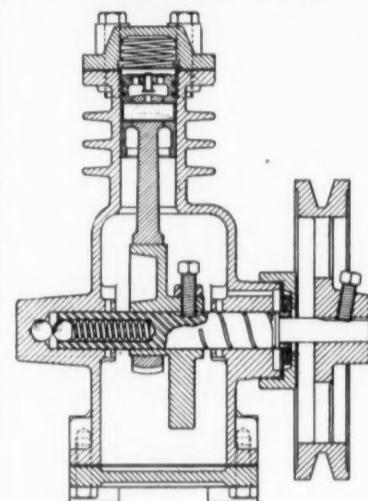


Fig. 4—Sketch of compressor body assembly showing counterbalanced eccentric.

that might prevent proper seating of the discharge valve.

The piston valve is held in place on top of the piston with machine screws. There is a small spacing washer between the valve disc and restricting plate. This spacer washer is to allow for movement of the valve.

This assembly may be removed for inspection. Care should be taken in beveling the valve disc as it is only

Piston Valve

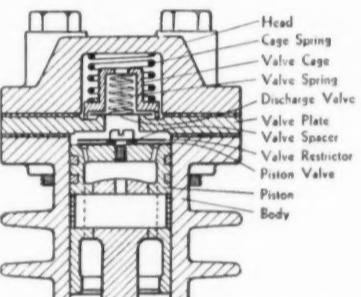


Fig. 3—This drawing shows the details of the piston and discharge valve assemblies.

and condensing unit assembly. The evaporator in Fig. 2 is the Mullins shell type. The condenser is of the finned tube type and the motor is equipped with a fan to provide air movement over the condenser.

The specifications at the right above give the oil and refrigerant charge for the various models and other information of value to the service man.

Fig. 3 shows the details of the Dayton piston and discharge valve assemblies. The discharge valve is made of thin polished Swedish steel. It is held in contact with the valve spring, Fig. 3, and its movement is

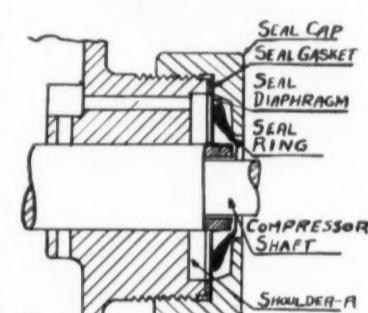


Fig. 5—Detailed drawing of Dayton shaft seal retaining nut or seal cap.

.004 in. thick. In replacing the disc see that the burred edge is up.

Fig. 4 shows the entire compressor body assembly. Note the counterbalanced eccentric is used. The thrust on the eccentric shaft is toward the seal. This is for the reason that the Dayton seal is of the diaphragm type as shown in Fig. 5.

Operating Cycle

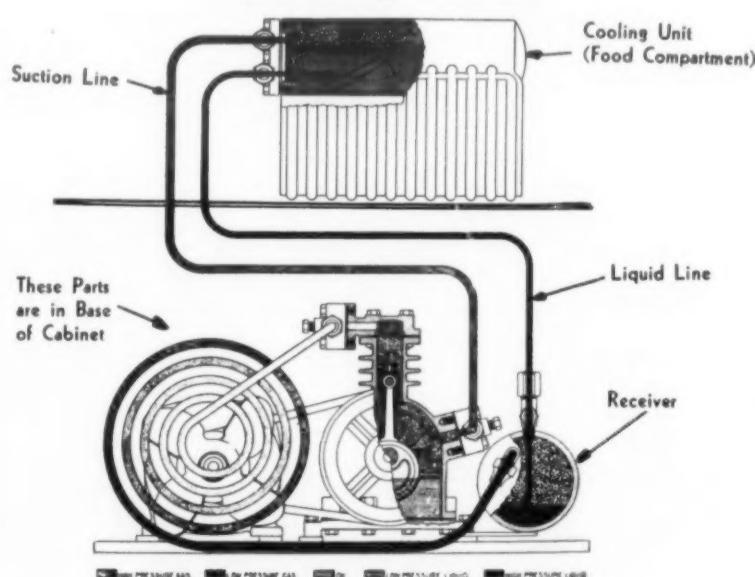


Fig. 1—The cross-section drawing above shows the operating cycle of the Dayton units.

Evaporator and Condensing Unit

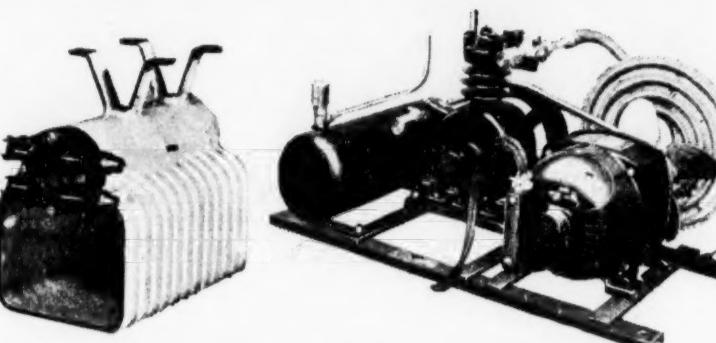


Fig. 2—The photograph at the left above shows the Mullins evaporator used by Dayton and at the above right is pictured the condensing unit assembly. Note the finned tube type condenser.

Specifications of Dayton Refrigerators

Model No. 1935	5-C-2	6-C-3	7-C-4	8-C-4	283-P
Model No. 1934	5-B-2	6-B-3	7-B-4	8-B-4	
Refrigerant charge (lbs.)	3%	4%	5	5	4%
Oil charge, compressor (pts.)	1/2	1/2	1/2	1/2	1/2
Oil charge, evaporator (pts.)	5/6	5/6	5/6	5/6	5/6
Compressor capacity (I.M.E.)	85	85	85	85	85
Motor size (hp.)	1/6	1/6	1/6	1/6	1/6
Compressor speed (r.p.m.)	800	800	800	800	800
Compressor bore (in.)	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
Compressor stroke (in.)	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Number of cylinders	1	1	1	1	1
Compressor drive					
Make of motor					
Type of motor					
Are replacement parts sold to independent service men?	Yes				

28 of the **MASTER SERVICE MANUAL**. The seal retaining nut or seal cap, Fig. 5, is provided with left-hand threads, and must be turned counter-clock wise for removing.

The shaft shoulder may be refaced or polished as given in Chapter 4, paragraph 55, and illustrated in Fig.

Refrigeration Service, Inc. Of Los Angeles Puts Out 128-Page Parts Catalog

LOS ANGELES — Refrigeration Service, Inc., has recently issued a 128-page spiral-bound catalog, listing its complete line of refrigeration supplies, tools, and accessories for dealers and independent service men and companies.

Shown in the catalog are Crescent, Hinsdale, and Imperial tools; Bristol thermometers and hygrometers; Dayton V-belts; R. S. I. and Chieftain compressors; R. S. I. and Bush condensers; Detroit Lubricator control switches; Ranco thermostats; Penn controls for refrigeration and air conditioning; McIntire D. F. N. dehydrators-filters-neutralizers; Drayer & Hanson copper and steel expansion coils; D & H copper case coils.

Recold evaporators, direct expansion coils, and ice makers; Kerotest refrigeration fittings; Victor gaskets; cabinet hardware; replacement ice trays; Superior motor brushes; motor bushings and parts; Ermstat overload protectors; motor fans, pulleys, and pulley bushings; and a complete line of Perfection refrigeration parts.

The catalog lists Virginia Smelting Co. methyl chloride and sulphur dioxide, and isobutane, Freon, and ethyl chloride, as being carried in stock for immediate delivery. Ice cream freezers, of both pan and circular type, food odor absorbers, and ice breakers are also shown, as well as porcelain hydrators, defrosting pans, dish sets, and Scurlock Kontanette sets.

Back of the book lists first aid advice in case of refrigerant accidents, shows proper fuses for various motor sizes, and outlines regulations for the shipment of refrigerators in cylinders.

Page 3 of the catalog is given over to a description of the publications of Business News Publishing Co.

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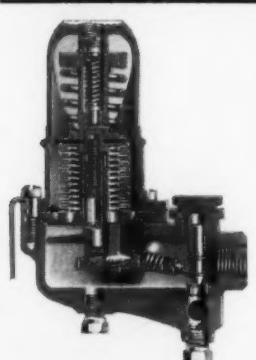


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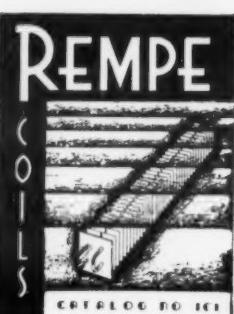


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COMING

A Commercial Refrigeration Service Manual by K. M. Newcum

A new manual on commercial refrigeration service is now being compiled by K. M. Newcum, author of the **MASTER SERVICE MANUAL**.

The commercial service instructions will first be published serially in ELECTRIC REFRIGERATION NEWS and will appear later in book form. The first chapter will be published early in July.

Service men who are especially interested in the commercial service articles may obtain the complete series by sending \$1.50 for a 6-months subscription to the NEWS to start with the July 1 issue.

Letters from Service Men

School on Long Island

I am conducting a Refrigeration & Air Conditioning School in this city and am very much interested in the publication ELECTRIC REFRIGERATION NEWS. I should appreciate it if you would quote me your special subscription price.

Also in Volume No. 17, No. 17, Issue 370, on page 24 you advertise a **MASTER SERVICE MANUAL**. I believe I could use this in my classes as a reference manual. Would it be possible to send me a sample copy of this?

I will appreciate any cooperation you may be able to give me.—A. R. Kassner, 60 S. Ocean Ave., Patchogue, N. Y.

I am a subscriber to your News and would like to have you put me on your catalogue mailing list. Just recently, I finished a course with the Refrigeration and Air Conditioning Institute in Chicago and now I am servicing the refrigeration plant on this dairy and creamery. But soon I expect to pick up more business in this territory. I will need some literature to keep posted on prices and the latest development.—Alfred Haller, Pleasanton, California.

Am in receipt of your letter of the 22nd, and have received the sample copies of ELECTRIC REFRIGERATION NEWS. Have found these very interesting and am attaching a check for \$3.00 for one year's subscription, together with the card for the specifications issues.

I infer from your May 13 publication that you maintain a free catalog mailing list. If such is the case, please add my name to this list.—Albert J. Wagner, 565 Donnan Ave., Washington, Pa.

Will you please put my name on your mailing list for refrigeration catalogs. Thank you.—Leonard Kojola, Monica Refrigeration Service, 15907 Monica Ave., Detroit, Mich.

Kindly stick my name on your "catalogue mailing service list" for information on replacement parts and supplies. Thank you.—Standard Radio & Refrigeration Service, 325 Broad St., Newark, N. J.

I am taking a course in refrigeration with R.A.C.I. of Chicago and expect to start work in this field shortly.

I should like to have my name added to your Catalog Mailing List.—Lloyd B. Crockett, 225 Chester St., Buffalo, N. Y.

As a reader and subscriber of your fine magazine and doing spare time service work I would appreciate having my name added to your catalogue mailing list. Thank you.—Curtis A. Nyce, 122 E. Broad St., Souderton, Pa.

Enclosed please find money order for \$3.00 for which please send me the new **MASTER SERVICE MANUAL** on household service. Will you please send book immediately, as I will have special need of it very soon, also will you put my name on catalogue mailing list.—M. A. Towne, 6237 29th N. E., Seattle, Wash.

Kindly place my name on your catalog mailing list and send me particulars on ELECTRIC REFRIGERATION NEWS subscription.—Leo A. Kolancheck, 1560 S. Fifth St., Milwaukee, Wis.

Please enter my name on catalog list.—Eugene Sommer, Hazelton, Kan.

Here are two more names for your Catalog Mailing List:

Henry Klett, Selkirk, N. Y.

Richard Wurstlin, R. No. 1, Hudson, N. Y.

Denver Telephone Book Uses Cartoons Leading To Service Section

DENVER, Colo.—Electric refrigerator dealers listed in the Denver telephone directory have been given a boost this year by the telephone company, through a clever cartoon preceding the listing, directing subscribers' attention to the section devoted to refrigeration service.

Two score or so of these humorous sketches have been scattered through the classified yellow pages, all clever enough to make a subscriber thumb through the pages just to "read the funnies."

Several pages before the refrigerator classification, the subscriber comes upon the pen-and-ink sketch of a woman, vainly fanning (with a fan in either hand) a rapidly melting dish of ice cream, placed in the supposedly cooling breeze of an electric fan.

Caption reminds the reader: "You'll find Refrigeration Service listed in the Yellow Pages."

Ray Strahan Organizes Refrigeration Parts Firm in Los Angeles

LOS ANGELES—Ray Strahan, for two years manager of Refrigeration Supplies Distributor, has started his own parts jobbing firm, Refrigeration Parts, Inc., at 221 North Vermont Ave. here.

In addition to his two years with R. S. D., Mr. Strahan has spent the greater part of the last 10 years in the refrigeration business.

Refrigeration Parts, Inc., opened for business last month with a complete stock of refrigeration supplies. The company will operate exclusively as a wholesale outlet.

Exports of Electric Refrigerators

March, 1936, Shipments Reported by the Bureau of Foreign and Domestic Commerce, Washington, D. C.

	Electric Household Refrigerators Number	Electric Commercial Refrigerators Up to 1 Ton Value	Parts for Electric Refrigerators Value
Austria	59	\$ 3,739	25 \$ 1,348
Azores & Madeira Islands	1	151	2,388
Belgium	219	17,880	44 3,860
Bulgaria	19	1,280	195
Czechoslovakia	1	127	27,580
Denmark	1	1,069	1,313
Finland	15	23	2,478
France	982	16,572	50,627
Germany	2	217	...
Gibraltar	1	188	...
Greece	36	3,925	900
Irish Free State	222	20,234	515
Italy	225	20,561	1,470
Malta, Gozo & Cyprus	1	119	3
Netherlands	289	8,262	11,973
Norway	281	5,252	5,534
Poland & Danzig	11	857	342
Portugal	1	300	...
Rumania	62	4,282	74
U.S.S.R. (Russia)	10	2,250	450
Spain	347	15,566	9,990
Sweden	257	5,017	14,867
Switzerland	65	4,313	...
United Kingdom	5,371	13,835	148,513
Canada	2,003	16,257	117,281
British Honduras	1	57	5
Costa Rica	2	238	...
Guatemala	15	1,172	29
Honduras	14	878	8
Nicaragua	6	1,062	78
Panama	89	10,482	1,796
Salvador	18	1,834	214
Mexico	372	32,753	8,803
Newfoundland & Labrador	14	3,223	15
Bermuda	25	1,776	250
Barbados	17	1,029	...
Jamaica	1	62	31
Trinidad & Tobago	23	1,866	255
Other British West Indies	11	1,111	124
Cuba	243	23,860	6,715
Dominican Republic	4	384	211
Netherland West Indies	36	3,299	632
French West Indies	8	637	33
Argentina	15	4,011	4,675
Bolivia	9	775	...
Brazil	482	40,811	7,103
Chile	22	2,410	1,295
Colombia	83	7,515	821
Ecuador	54	4,675	45
British Guiana	8	628	28
Surinam	4	398	...
Peru	123	10,291	1,555
Uruguay	19	1,871	303
Venezuela	121	10,340	121
Aden	10	805	245
Saudi Arabia	1	72	...
British India	490	41,688	7,111
British Malaya	128	10,819	1,410
Ceylon	42	4,545	53
China	115	9,943	90
Netherlands India	502	46,426	2,057
French Indo-China	134	11,515	807
Hong Kong	61	5,494	841
Iran	39	3,979	588
Japan	29	3,672	131
Palestine	961	76,507	2,117
Philippine Islands	173	18,733	2,088
Siem	52	4,177	...
Syria	107	8,178	4,402
Turkey	201	17,653	4,402
Australia	90	6,729	6,379
British Oceania	4	565	73
New Zealand	20	1,255	800
Belgian Congo	41	4,107	4
British East Africa	22	2,013	15
Union of South Africa	389	37,273	28,603
Gold Coast	34	3,419	90
Nigeria	2	351	20
Other British West Africa	2	164	1,371
Egypt	84	7,591	1,092
Algeria	71	5,669	2,689
Tunisia	208	16,385	2,643
Madagascar	9	614	100
Other French Africa	37	2,786	15
Morocco	161	13,723	966
Mozambique	110	11,353	1,988
Canary Islands	3	277	286
Other Spanish Africa	2	137	228
Total	16,651	\$1,340,315	\$544,933
Shipments to: Hawaii	506	52,850	5,388
Puerto Rico	176	14,831	2,603
Virgin Islands	7		

Questions

Instalment Sales

No. 2803 (Agency, Ohio)—"Can you tell us approximately what percentage of mechanical refrigerators are sold on an instalment basis?"

Answer: We do not know the percentage of mechanical refrigerators that are sold on an instalment basis, as no comprehensive study on this subject has been made; or if it has, results of the study have not been made public.

Data on Refrigerators

No. 2804 (Student, Washington)—"Please send me one copy of the special issue you have printed, showing comparative specifications for household refrigerators."

"I am writing a thesis for a degree in Mechanical Engineering at the University of Washington on the subject of household refrigerators and would be pleased if you could give me any additional information on the subject."

Answer: We believe you would find the article published in the March 25 issue of ELECTRIC REFRIGERATION News, by Prof. Royce E. Johnson of the University of Wisconsin of considerable interest and value to you in writing your thesis.

This article describes tests conducted on various electric refrigerators showing their current consumption and temperatures maintained under various conditions in the Electrical Standards Laboratory of the University of Wisconsin.

'Freshenair' Conditioner?

No. 2805 (Exporter, New York)—"We are anxious to get in touch with the manufacturers of the 'Freshenair Air Conditioner.' We have been told that they operate under the name of 'Gaylord' and are located in Chicago, but we would like to have their full name and address, and if you can help us out we would certainly appreciate it."

Answer: Can any reader supply this information?

Real Property Surveys

No. 2806 (Food Manufacturer, New York)—"We have a copy of your 1935 REFRIGERATION MARKET DATA Book which includes statistics covering sales of household refrigerators.

The information includes 1934. If the data for 1935 has been compiled, we should like very much to know the number of units sold, and the estimated total household refrigerators in use in the United States on January 1, 1936.

"We would also be interested in obtaining sales of household refrigerators by states.

In your data book you include a real property inventory which specifies the percentage of homes in 64 cities which are equipped with mechanical refrigerators. This inventory was completed in March, 1934. Is there any later information of this type available? If so, where can it be obtained? If not, do the figures giving the percentage of homes equipped with mechanical refrigerators in each of the 64 cities still apply?"

Answer: An estimate of the total



I CAN DO THE JOB My U. E. I. Training Taught Me How"

The U. E. I. courses of training in Electric Refrigeration and Air Conditioning were prepared with the cooperation of leading manufacturers. As a result, U. E. I. Trained Men are able to make good in almost any phase of Electric Refrigeration and Air Conditioning work right from the start.

If You Need a Trained Refrigeration Man call on the U. E. I. FREE Placement Bureau. Among the graduates of this School we have trained and competent Shop Mechanics, efficient Installation and Service Men and capable Sales Engineers available in almost every locality. Many already have practical working experience. Save time, trouble and money by using this Placement Service when adding to your force or making a replacement. No charge to you or to prospective employee. Write, phone or wire for quick, courteous, efficient service.

UTILITIES ENGINEERING INSTITUTE
404 N. Wells St. Established 1927 17 West 60th St.
Chicago, Illinois New York, N.Y.

number of household electric refrigerators in use in the United States in January 1, 1936 issue of ELECTRIC REFRIGERATION NEWS. A final estimate on 1935 household electric refrigerator sales was published in the March 25, 1936 issue of the News. These figures include sales by states.

There has been no extension of the real property survey, but the government has started a new series entitled, "Consumer Use Surveys," in which figures are given on the estimated market saturation of household electric refrigerators in particular cities.

We have published these reports in the following issues: July 17, 1935, September 4, 1935, October 23, 1935, December 11, 1935, February 26, 1936, and May 27, 1936. Back issues of ELECTRIC REFRIGERATION NEWS are available at a cost of ten cents per copy.

Association Officers

No. 2807 (Manufacturer, Connecticut)—"We are in receipt of the Oct. 30 issue of ELECTRIC REFRIGERATION NEWS which you so kindly sent us telling about the meeting of the Service Engineering Society, and the Parts and Jobbers Association.

"This is the meeting we had in mind, and we are now writing to inquire if you could give us the name of the secretary of these organizations."

Answer: Frank J. Gleason is executive secretary of the Refrigeration Supplies and Parts Manufacturers Association with offices at 2707 David Stott Bldg., Detroit, and H. T. McDermott is national secretary of the Refrigeration Service Engineers' Society with offices at 433 North Waller Ave., Chicago.

Manufacturers' Catalog

No. 2808 (Dealer, Massachusetts)—"Have you a catalog listing the refrigerator manufacturers on parts, tubing, controls, gaskets, etc.?"

"If you have a catalog of this nature would you kindly forward it to us c.o.d. and if not, would you kindly tell us where we may obtain one?"

Answer: The 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY lists all manufacturers of refrigeration and air conditioning equipment, and sells for \$3 per copy.

The new Specifications book which has been in process for several months and which we hope to have finished very soon, will include additional advertising of such suppliers. Price \$3. (Combination price for 2 books is \$5 and for 3 books is \$6.50.)

You will also note that many parts manufacturers advertise in the weekly issues of ELECTRIC REFRIGERATION NEWS.

Service Firms Abroad

No. 2809 (Manufacturer, Pennsylvania)—"We have a copy of your 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY, VOL. 1, and have found same very valuable in locating electric refrigeration service companies throughout the country, from the service section, when it becomes necessary for us to render service on any of the electric water coolers which we have installed all over the United States.

"We are at present urgently in need of information of a like matter, which is not contained in this book, and would greatly appreciate your assistance, if possible.

"We require service facilities at the following points: Balboa, Canal Zone; Pearl Harbor, T. H.; Honolulu, T. H.; Shanghai, China; Hongkong, China.

"If you have any information with regard to electric refrigeration companies at any of the above points, please let us have same as promptly as possible, or if unable to do so, kindly advise us where such information may be obtained."

Answer: We are listing the names of service companies, taken from our subscription records, located in the places about which you inquire. However, we do not know of one in Balboa, Canal Zone, and are listing the nearest one to it at Pedro Miguel.

J. F. Reinig
Box 66, Pedro Miguel, C. Z.

Clement F. Kam
Pearl City, Oahu, T. H.

H. Colvin
Refrigeration Service & Supply Co.
850 S. Beretania St., Honolulu, T. H.

S. E. Giles
Honolulu Technical School
800 S. Beretania St.
Honolulu, T. H.

H. C. Best
Refrigeration Services
4th Floor, Kings Bldg.
Hongkong, China

G. G. Bradford
American Engineering Co.
999 Bubbling Well Road
Shanghai, China

Leede Engineering Corp.
395 Bubbling Well Rd.
P. O. Box 1284, Shanghai, China

Fruit Storage Problem

No. 2810 (Dealer, Greece)—"As fruit growers and wholesale exporters of citrus fruits from this island, we are seriously interested to enter into direct business relations with you for the commercial refrigerating water-cooled units, compressors, etc. and beg to ask your assistance, to recommend us the competent American exporters for these electric refrigerators machinery as valves, fittings, piping, controls, thermostatic valves, humid-coolers, defrosters, and component parts, modern machinery for fruit storage house because we are desirous to buy from U. S. manufacturers components and accessories so as to be able and arrange in the coming July at least our house of fruit storage and so avoid the losses we have sustained by the improper European methods of storing oranges, lemons, and citrus fruit, and grapes."

"Please place our inquiry to some friendly exporters and makers of refrigerating for commercial purposes machinery, such as Humid-Coolers as in the New England states of the U.S.A. have arranged their refrigerated fruit systems on new principles, so as to be able ourselves with the American machinery (Servel) or others etc. to maintain the correct temperature and the correct amount of humidity with the application of the corresponding thermostatic valves for the proper freezing up to 900.00— and pieces of oranges, lemons, or mandarins, picked up from the orchards with no damage and stored ripe and wrapped in fine tissue paper every fruit and placed in the usual light boxes, to be placed in the refrigerated storage house of about 975 M3 useful space, and house depth 20 m. width, 13 m. height, and 3.75 meters with the proper insulation with two cork plates of 20 cm. thickness and as power we have 220 volts A. C. per.

"The picking and storage of the fruits we are making in December and we desire to import reliable American machinery to keep these perishable fruits in the perfect frosted condition for about six months, viz up to June, every year and the maximum outside temperature is never more than 36° C. and the water to be used for condensing purpose not more than 70° F. Now with the above particulars you can persuade your friends to send us complete lay-out and estimations and send us as soon as possible firm offers and prices CIF. Greece or FOB. New York. Also specify what power compressors and humid-coolers for the proper refrigeration system of our fruit orange store house we must use.

Answer: Contact the following

"Awaiting a prompt and favorable reply and thanking you in anticipation."

Answer: We do not maintain an engineering department with facilities for figuring and estimating the kind of job that you seem to require.

We are referring your inquiry to manufacturers who will be able to give you estimates covering requirements.

Parts Catalogs

No. 2811 (Service Company, Vermont)—"Will you please send me your price list of refrigerator parts and any catalogs you may have on refrigerators."

Answer: Write to the various manufacturers of refrigerator parts for price lists. Refrigerator parts manufacturers are listed in the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY, as well as manufacturers of household and commercial refrigerators and air-conditioning equipment. Leading manufacturers of parts advertise in the weekly issues of ELECTRIC REFRIGERATION NEWS.

Sales by Months

No. 2812 (Publishing Firm, Ohio)—"We should appreciate it very much if you could send us the total electric refrigeration unit sales by months for the year 1935."

Answer: January, 103,400; February, 128,400; March, 228,000; April, 281,900; May, 261,100; June, 174,860; July, 167,000; August, 120,700; September, 63,852; October, 56,690; November, 57,027; December, 79,240.

Fuel Oil Journal

No. 2813 (Manufacturer, Michigan)—"Could you tell us where we could get a copy of the Fuel Oil Journal?"

Answer: Fuel Oil Journal, 420 Madison Ave., New York, N. Y.

Hospital Refrigerator

No. 2814 (Contracting Firm, Iowa)—"We are looking to you for the names of manufacturers who can furnish us a refrigerator cabinet equipment with biological trays for hospital use.

"We have already written the Seeger Refrigerator Co. but they can only furnish the cabinet and do not know where we can get the biological drawers to fit, and recommended that we write you feeling sure that you knew someone who can furnish us quotations on this equipment."

Answer: Contact the following

manufacturers:
Frigidaire Corp.
Dayton, Ohio
Fedders Manufacturing Co.
57 Tonawanda St., Buffalo, N. Y.
General Electric Co.
Nela Park, Cleveland, Ohio
Westinghouse Electric & Mfg. Co.
Mansfield, Ohio

'Refrigeration Manual'

No. 2815 (Manufacturer, Michigan)—"A gentleman was in our office yesterday saying that he had seen a book entitled ELECTRICAL REFRIGERATION MANUAL, but did not know the name of the book, nor the author. This book contains specifications and service information on all types of electric refrigerators. Do you know of this book, and if so, where can it be obtained?"

Answer: We have recently published the MASTER SERVICE MANUAL by K. M. Newcum. This Manual contains 440 pages, with many illustrations, giving installation, operation and service information on all the fundamental present-day types of household electric refrigerators and on fifteen orphan makes of refrigerators.

Specifications of household electric refrigerators are not included in this book, but will be published in the very near future in the REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS Book, which will include detailed specifications for all models and makes of household and commercial refrigeration, including new designs for 1936. Air-conditioning specifications will also be given.

THE MASTERCRAFT ADJUSTABLE PAD AND CARRYING HARNESS FOR SAFE DELIVERY OF AUTOMATIC REFRIGERATORS

Pad and harness adjustable to many sizes and styles of cabinets. Economical. Sturdily constructed, easily applied. Name of refrigerator attractively lettered on pad without charge.

Pad (Adjustable) \$9.50 ea.
Harness (Adjustable) \$6.00 ea.

Illustration at left shows type F adjustable harness and adjustable pad. For other types, also individual carrying straps, write for full information.

BEARSE MANUFACTURING CO.
3815-3825 Cortland Street, Chicago, Illinois

PERFECTION

Certified Parts for REFRIGERATION SERVICE

All Perfection Parts are certified to excel.

Today, the symbol of Perfection is universally recognized as assurance of skilled engineering, the use of best suited materials, precision workmanship and efficient service.

Leading jobbers of refrigeration parts and supplies stock this complete line, and are prepared to make immediate deliveries.

Men servicing refrigerators appreciate the value and convenience of being able to buy Perfection Products through the jobber, and they know from experience that these parts are easy to install, will fit properly, operate quietly, and give long dependable service.

PARTS for COMPRESSORS

This complete line includes compressor parts for Frigidaire, Kelvinator, Copeland, Servel, Universal, Zerozone and others. These replacements include Valve Plate Assemblies, Bellows Seals, Connecting Rods, Pistons, Piston Pins, Piston Rings, Eccentric Shafts, Eccentrics, Shaft Seal Faces, etc.

VALVES and FITTINGS

The same high standards of engineering, manufacturing, testing and packaging are reflected throughout the unusually complete line of Perfection Refrigeration Valves and Fittings.

Valve Bodies are made of forged brass having grain structure that prevents seepage of refrigerant . . . Stems are corrosion-proof . . . Recognizing the importance of leak-proof joints, threads and seats are as near perfect as possible . . . Fittings are uniform in diameter, threads are accurately cut, and are carefully protected by cardboard sleeves when packed in cartons.

Complete catalogs can be obtained from your Perfection jobber.

PERFECTION REFRIGERATION PARTS CO.
(A division of the Perfection Gear Company. Established 1919)

HARVEY, ILLINOIS

Patents

Issued May 19, 1936

2,040,828. COOLER. George B. Bright, Detroit, Mich., and Martin H. Oistad, Bayside, N. Y., assignors to Niagara Blower Co., Buffalo, N. Y. Application Dec. 26, 1933, Serial No. 703,882. 12 Claims. (Cl. 257—67.)

2,040,894. ABSORPTION REFRIGERATION. Glenn F. Zellhofer, Bloomington, Ill. No Drawing. Application Dec. 11, 1934, Serial No. 756,979. 2 Claims. (Cl. 252—5.)

2,040,920. UNITARY AIR CONDITIONER. Charles Christofferson and Alfred G. Wahlberg, Duluth, Minn. Application May 12, 1933, Serial No. 670,726. 3 Claims. (Cl. 126—101.)

2,040,947. HEAT EXCHANGER. Oliver W. Mojonnier, River Forest, and Harry G. Mojonnier, Oak Park, Ill., assignors to Mojonnier Bros. Co. Application April 17, 1935, Serial No. 16,834. 30 Claims. (Cl. 257—184.)

2,041,026. BEVERAGE COOLING AND DISPENSING APPARATUS. Martin Senese, Detroit, Mich. Application Feb. 26, 1934, Serial No. 712,945. 4 Claims. (Cl. 62—141.)

2,041,039. COMBINED HEATING AND COOLING SYSTEM. Samuel M. Anderson, Sharon, Mass., assignor to B. F. Sturtevant Co., Inc., Boston, Mass. Application

Jan. 31, 1934, Serial No. 709,118. 10 Claims. (Cl. 257—7.)

2,041,045. REFRIGERATION. Willis H. Carrier, Elizabeth, and Robert W. Waterfill, East Orange, N. J., assignors, by mesne assignments, to Carrier Engineering Corp., Newark, N. J. Application Oct. 27, 1933, Serial No. 695,394. 3 Claims. (Cl. 62—178.)

2,041,128. REFRIGERANT COMPRESSOR. Willy Hirche, Leopoldshain, near Gorlitz, Germany. Application Sept. 5, 1931, Serial No. 561,453. In Germany Sept. 10, 1930. 1 Claim. (Cl. 230—234.)

2,041,241. FLUID COOLING SYSTEM. Edwin R. Goldfield, Cleveland Heights, Ohio, assignor to Waite & Bartlett X-Ray Mfg. Co., Cleveland, Ohio, corporation of New York. Application Dec. 10, 1934, Serial No. 756,781. 4 Claims. (Cl. 250—34.)

2,041,246. THERMOSTATIC SWITCH. George Hegeman Hart, West Hartford, Conn. Application Sept. 4, 1934, Serial No. 742,589. 10 Claims. (Cl. 200—139.)

2,041,328. HEAT EXCHANGER. James B. Forbes, Mount Vernon, N. Y., assignor to Alco Products, Inc., New York, N. Y., corporation of Delaware. Application Aug. 12, 1935, Serial No. 35,822. 10 Claims. (Cl. 257—247.)

2,041,416. SOLENOID VALVE. Roy W. Johnson, Milwaukee, Wis. Application Oct. 3, 1932, Serial No. 636,003. 4 Claims. (Cl. 137—139.)

2,041,511. REFRIGERATING APPARATUS. George C. Pearce, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp. Application June 18, 1932, Serial No. 618,007. 8 Claims. (Cl. 200—81.)

2,041,566. THERMOSTAT. William N. Mischer, Scotia, N. Y., assignor to General Electric Co. Application March 15, 1934, Serial No. 715,631. 11 Claims. (Cl. 200—139.)

2,041,585. REFRIGERATION SYSTEM FOR MOTOR VEHICLES. Sigurd Mattias Backstrom, Stockholm, Sweden, assignor, by mesne assignments, to Servel, Inc., Dover, Del. Application Oct. 24, 1933, Serial No. 694,922. In Germany Nov. 12, 1932. 12 Claims. (Cl. 62—117.)

2,041,598. AIR CONDITIONING SYSTEM FOR MOTOR VEHICLES. Sandro C. Farne, Cambridge, Mass. Application Jan. 31, 1935, Serial No. 4,353. 4 Claims. (Cl. 257—125.)

2,041,645. THERMOSTATIC SWITCHING MECHANISM. John P. Kriechbaum, Minneapolis, Minn., assignor to Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., a corporation of Delaware. Original application June 30, 1933, Serial No. 678,429. Divided and this application May 14, 1934, Serial No. 725,459. 20 Claims. (Cl. 200—139.)

REISSUES

19,973. REFRIGERATING APPARATUS AND PROCESS. Howard L. Forman, Kitchawan, N. Y. Original No. 1,908,968, dated May 16, 1933, Serial No. 630,349, Aug. 25, 1932. Application for reissue Jan. 2, 1934, Serial No. 705,005. 26 Claims. (Cl. 62—104.)

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

SALES MANAGER

SALES MANAGER or representative for items sold on large contracts. Well acquainted with engineering, purchasing and production executives of nearly all manufacturers of mechanical and ice refrigerators in entire country. More than ten successful years in present position. Legitimate reason for wanting to change. Favor promotional work on new product of merit where acquaintance will be an asset. Not a cheap man but one who can get results. Single, so no objection to extensive traveling. Address Box 807, Electric Refrigeration News.

POSITIONS WANTED

WANTED—DESIGN ENGINEER. Prominent manufacturer entering field seeks draftsman with experience in design of electric refrigeration controls. Consideration will only be given applicants who give definitely in first letter their experience in this field. State salary expected for this excellent opportunity. Replies held confidential. Box 806, Electric Refrigeration News.

POSITIONS WANTED

SALES MANAGER of commercial and domestic refrigeration and appliances, now employed, desires similar position with aggressive distributor or dealer, preferably in South. Twelve years' experience in refrigerator and appliance selling. Can train salesmen, organize and develop territory. Can figure, accurately, all types commercial jobs. Give full particulars in first letter. Box 803, Electric Refrigeration News.

EQUIPMENT FOR SALE

FRIGIDAIRE plain T two temperature valves \$2.50. Mercoind No. 848 controls complete with tube \$5.00. Try Warrenol for stuck-up compressors. Samples available. Thermostats, float valves, and expansion valves rebuilt. Prompt service. Same day shipment on refrigerant gases. HALECTRIC LABORATORY, 1793 Lakeview Road, Cleveland, Ohio.

FRIGIDAIRE MODEL G twin cylinder highside $\frac{1}{4}$ hp., \$24.50. Model S, \$19.50. Model A, \$29.50. Single cylinder \$15.00. Model N, $\frac{1}{2}$ hp., \$60.00. Model C, 1 hp., \$90.00. Kelvinator single cylinder \$15.00. Twin cylinder, $\frac{1}{4}$ hp., \$30.00; $\frac{1}{2}$ hp., \$55.00; $\frac{1}{2}$ hp., \$65.00. Copeland $\frac{1}{4}$ hp. Model L, complete with motor and compressor in working order, \$4.75. FEDERAL REFRIGERATOR CORPORATION, 57 East 25th Street, New York City.

REFRIGERATION DEALERS! Make money with Federal's reconditioned refrigerators, 1000 refrigerators such as Frigidaire, G. E., Kelvinator, Electrolux, etc., completely remanufactured and rebuilt, some as is, as low as \$15; also hundreds of new refrigerators priced for promotional purposes. FEDERAL REFRIGERATOR CORP., 57 East 25th St., New York.

DEALERS and servicemen. Used refrigerators "As Is." Reconditioned, spray them yourself, save money. Frigidaires \$19.00 up, Kelvinators \$15.00 up, Copelands \$15.00 up, General Electrics \$19.00 up, Electrolux, Gibsons, Majestics, Bohn, Servels, Ice-O-Matic, Graybars, Coldairs, Lectrice, Holmes, G & S $\frac{1}{4}$ h.p. Frigidaire units. Others from $\frac{1}{4}$ h.p. to 1 h.p. \$12.50 up. Pilgrim Refrigeration Co., 43-47 39th Place, Long Island City, N. Y.

EQUIPMENT WANTED

WANTED TO BUY—General Electric hermetic sealed units, household models preferred. REX REFRIGERATION SERVICE, INC., 446-48 East 79th Street, Chicago.

REPAIR SERVICE

SAVE MONEY on electric motor repairs. We rebuild and rewind thousands of motors yearly for largest refrigeration firms in the East and can save you money on your motor problems. Write for our price schedule for rewinding or rebuilding motors for refrigeration, oil burners,

washing machines, motor stokers, and air conditioners. Out of town motors are picked up and delivered by our motor transportation service. Write for our dealers' price list. P. J. QUINN'S SONS, INC., 166 Vernon Ave., Long Island City, N. Y.

MAJESTIC UNITS repaired \$17.50. General Electric units, \$30.00. Send your Majestic units to Ft. Smith and get them fixed right. We positively guarantee that we can make Majestics freeze as fast as when new. PENO SERVICE CO., Ft. Smith, Ark.

MAJESTIC UNITS: any model, rebuilt or exchanged \$20.00 f.o.b. Chicago. Guaranteed six months. All models in stock for prompt exchange. Wholesale only. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago, Ill.

FIX MAJESTICS YOURSELF. Service men—get out of competition and get in the money; be first to know how to fix Majestics and General Electrics in your community. We give you step by step instructions on how to open these units and repair them. These instructions are told to you in service man's language so any service man can understand them. Majestic instructions \$10.00—General Electric instructions \$5.00. Remember if you don't learn how to fix sealed units, you will soon be eliminated. PENO SERVICE COMPANY, Ft. Smith, Ark.

New 80-Page Catalog for Service Men

A complete line of nationally known products in refrigeration and air conditioning parts and supplies. Tools, Supplies, Parts, Motors—everthing the service man needs! And Blythe gives you "Same day Service."

Write for your copy today!

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Refrigeration
and Air Conditioning
PRODUCTS

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- COMMERCIAL EVAPORATORS
- DOMESTIC EVAPORATORS
- COMFORT COOLERS
- MARKET COOLERS
- AIR CONDITIONING SURFACE
- UNIT HEATERS
- BLAST HEATING SURFACE
- CATALOGS ON REQUEST

McCORD RADIATOR & MFG. CO.
DETROIT, MICH.

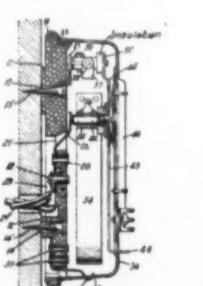
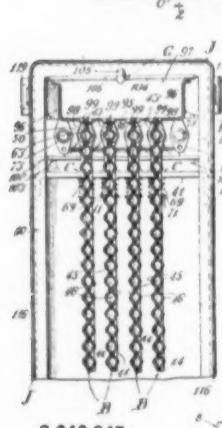
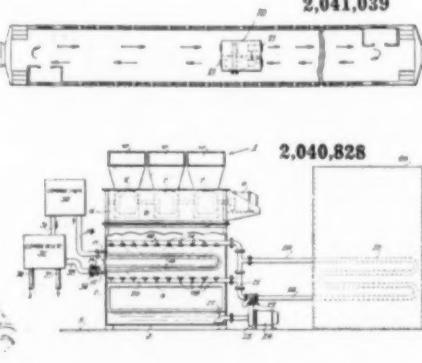
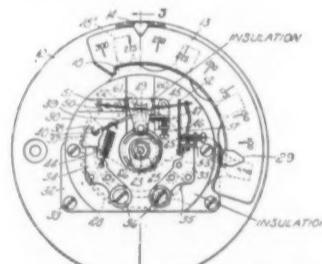
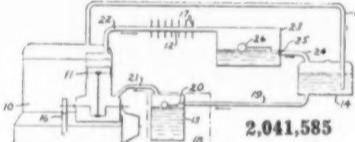
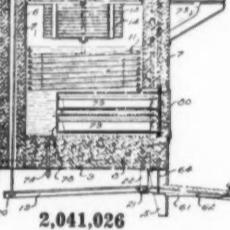
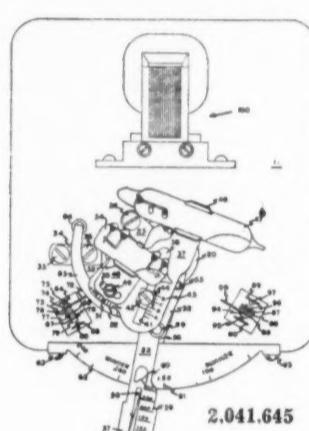
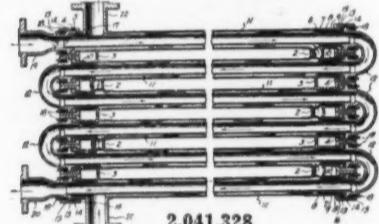
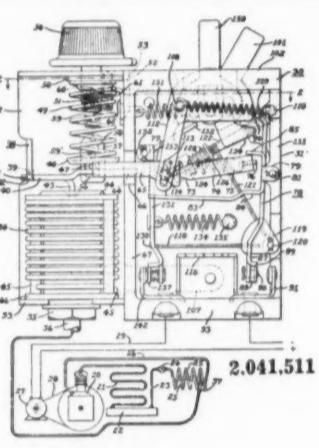
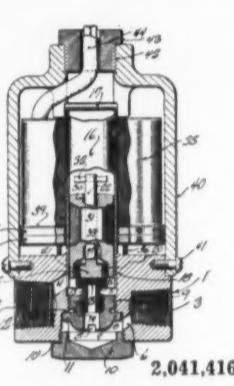
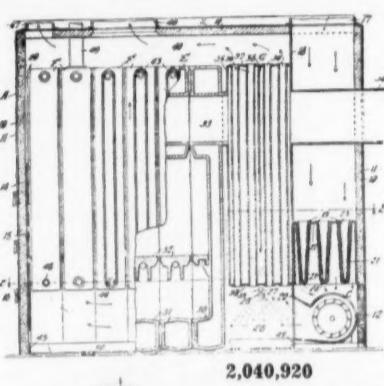
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The Refrigeration Engineer's Manual

By S. L. Potts

Five Types of Systems Used for Cooling Condenser Water

Chapter 12—

Cooling Towers

One of the most important problems confronting the refrigeration engineer is where to get the cold cooling water required for use in condensers when his plant is not located on a large river or lake. City water is too expensive unless used repeatedly. Therefore, cooling must be resorted to and a cooling tower or a pond must be used.

Capacity of the plant is governed to a large degree by the condenser cooling water. As the exit temperature of the cooling water rises, the capacity of the plant falls off.

Sources of Condenser Water Supply

(1) *City water*—this is too expensive and the use is restricted in summer when the plant demand is the greatest.

(2) *Rivers or lakes*—over all cost of owning water front property and pumping costs.

(3) *Well water*.

(4) *Collecting water from rainfalls*.

Cooling Methods

Principal of all cooling methods is to present a large surface area of water to the action of air currents and to evaporation. Evaporation produces cooling. Radiation and conduction account for a very small amount of cooling.

Rate of cooling of water depends upon:

(1) The amount of surface exposed to the atmosphere.

(2) The velocity of air currents that carry away the air that becomes saturated with vapor.

(3) Dry bulb temperature.

(4) Wet bulb temperature.

(5) Length of time water is exposed to air.

Factors 1 and 5 depend upon the type of equipment used to cool water.

Factor 2 depends on wind velocities or on fans which produce the movement of air or the forced draft.

Factors 3 and 4 are variables that cannot be controlled. They depend upon the geographical location, the season, and the meteorological conditions of air which change from day to day.

Five Types of Water Cooling Systems in Use

(1) *The cooling pond.*

(2) *The spray pond.*

(3) *Atmospheric cooling tower*—air currents flowing horizontal or at right angles to water flow.

(4) *Atmospheric cooling tower*—chimney or natural draft. Air currents flowing vertical or counterflow to water.

(5) *Fan draft cooling tower*—air currents flowing vertical or counterflow to water. Induced by fan.

Cooling Pond

The cooling pond, or reservoir without sprays, requires large areas available at low cost. The capacity of a pond is limited and it only produces a small range of temperature difference.

The rate of evaporation from a pond or reservoir in still air is very low. It may be found by this formula:

$$G = (240 + 3.7t) \times (Ps - P)$$

G—Grains of moisture evaporated per square foot of surface per hour. (7,000 grains = 1 lb.)

t—Temperature of water (average of pond) in deg. F.

Ps—Pressure of saturated vapor in inches of mercury. Corresponding to temperature "t".

P—Actual vapor pressure of the air in inches of mercury.

For average summer conditions, ponds without sprays dissipate about 4 B.t.u. per square foot per hour per degree difference of temperature between average temperature of water in pond and the air. In winter weather, this cooling rate is reduced to about 2 B.t.u. per square foot per hour per degree difference of temperature between water and air.

A pond need not exceed 3 ft. in

Spray Nozzle

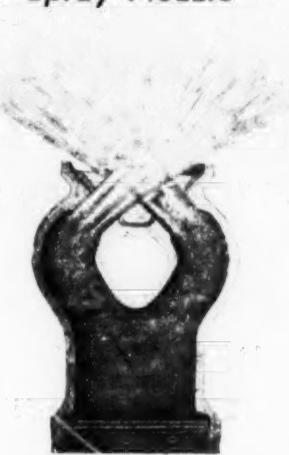


Fig. 91—Impact spray nozzle made of cast bronze and threaded to fit standard pipe. Nozzle capacities are given in Table 16.

depth to give the full capacity of cooling. Inlet pipe should be down 6 ft. below water surface and enter an inlet well. The suction should be located so as to prevent short circuiting of hot water and be protected by baffles or screens with submerged opening.

Spray ponds. The hot water is broken up into as fine a spray as possible to present as large a cooling or contacting surface between water and air as possible. A louvered fence is required to prevent loss of water by high winds.

Location must be in open space upon roof of building where air currents are unobstructed.

Number of nozzles will depend on the quantity of water to be sprayed. The number of nozzles should be such as to be able to handle the entire quantity of water with pressures on nozzle of 5 to 10 lbs.

Loss by evaporation amounts to about 1% for a 10° cooling which amounts to about 1° F. per degree cooling. For every 10° cooling produced in water, there will be a loss in the water by evaporation of about 1%. This is for evaporation only and does not include any loss due to air currents removing moisture.

To illustrate this, to evaporate one pound of water at 100° F. requires 1036 B.t.u. of latent heat. If all this heat energy is supplied by the cooling pond water, it would be capable of lowering the temperature of 100 lbs. of water 10.36° F. Say 10 degrees.

(Continued on Page 28, Column 1)

Table 16—Nozzle Capacities

No. Size In.	5	6	7	8	9	10	12	15	20	25	30	40	50	Capacity in U. S. gallons per minute
														1 2 3 4 5 6 7 8 9 10 12 15 20
60	2	53.0	58.0	62.5	67.0	71.0	74.5	82.0	92.0	106.0	118.0	130.0	150.0	167.0
50	2	44.0	48.0	52.0	55.5	59.0	62.0	68.0	76.0	88.0	98.0	107.0	124.0	138.0
45	2	40.0	43.5	47.0	50.0	53.0	56.0	61.0	69.0	79.0	88.5	97.0	112.0	125.0
40	2	35.4	38.8	42.0	45.0	47.5	50.0	55.0	61.0	71.0	79.0	87.0	100.0	112.0
35	2	30.3	33.8	36.4	39.0	41.2	43.5	48.0	53.5	61.5	68.0	75.0	87.0	97.0
30	2	26.8	28.6	31.0	33.0	35.0	37.0	40.5	45.5	52.0	58.5	64.0	74.0	82.5
25	22.0	24.0	26.0	27.8	29.4	31.0	34.0	38.0	43.8	49.0	53.5	62.0	69.0	
20	17.5	19.4	20.8	22.2	23.5	24.8	26.0	30.5	35.0	39.0	43.0	49.5	55.5	
15	13.0	14.3	15.5	16.5	17.5	18.5	20.2	22.6	26.0	29.0	32.0	37.0	41.5	
10	8.7	9.6	10.4	11.1	11.7	12.4	13.5	15.2	17.5	19.5	21.5	24.8	27.8	
8	7.0	7.7	8.3	8.9	9.4	9.9	10.8	12.1	14.0	15.6	17.0	19.7	22.0	
5	4.4	4.8	5.2	5.5	5.9	6.2	6.8	7.6	8.8	9.8	10.8	12.4	13.8	
4	3.5	3.8	4.1	4.4	4.7	4.9	5.4	6.1	7.0	7.8	8.6	9.9	10.1	
3	2.6	2.9	3.1	3.3	3.6	3.7	4.1	4.5	5.2	5.9	6.4	7.4	8.3	
2	1.7	1.9	2.1	2.2	2.3	2.5	2.7	3.0	3.5	3.9	4.3	4.9	5.5	
A	.9	1.3	1.45	1.55	1.65	1.78	1.86	2.0	2.3	2.6	2.9	3.2	3.7	4.1
B	.95	1.04	1.12	1.20	1.27	1.35	1.48	1.65	1.9	2.1	2.3	2.7	3.0	

*For which nozzle is threaded.

Spray Pond Layout

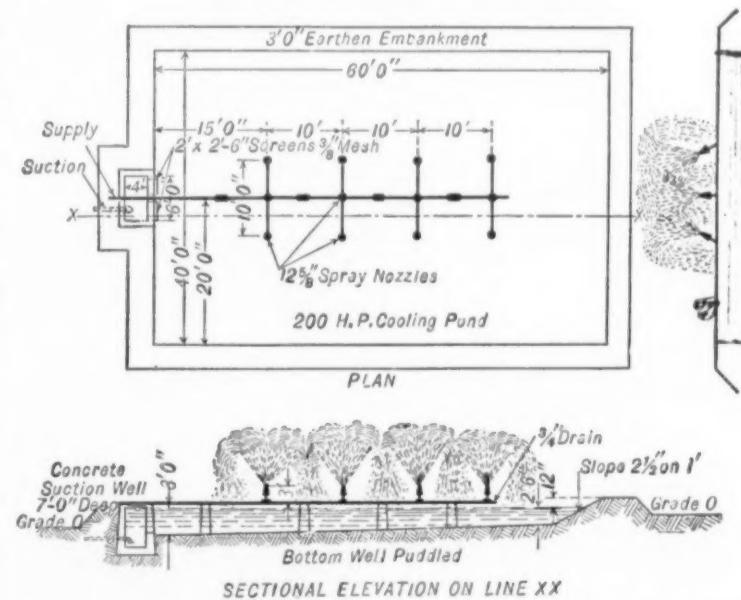


Fig. 90—The above sketch shows how the spray pond may be built with earth sidewalls and bottom or with concrete. Many times the pond may be one that exists naturally, and the spray nozzles can be installed.

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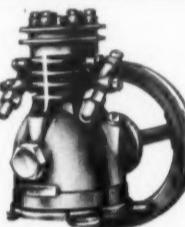
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